

# Contemporary Metal Music Production

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# **Abstract**

## Abstract

Distinct challenges are posed when conveying Contemporary Metal Music's (CMM) sounds and performance perspectives within a recorded and mixed form. CMM often features down tuned, heavily distorted timbres, alongside high tempi, fast and frequently complex subdivisions, and highly synchronised instrumentation. The combination of these elements results in a significant concentration of dense musical sound usually referred to as 'heaviness'. The publications for this thesis present approaches, processes and techniques for capturing, presenting and accentuating heaviness, as well as intelligibility and performance precision which facilitate the listener's clear comprehension of the frequent overarching complexity in the music's construction. Intelligibility and performance precision are the principal requirements for a high commercial standard of CMM, and additionally can enhance a production's sense of heaviness.

This synoptic commentary defines heaviness from an ecological perspective, by highlighting invariant properties that shape the embodied experience of being human. Heaviness is primarily substantiated through displays of distortion and, regardless of the listening levels involved, the fundamentals of this identity are ecologically linked to volume, power, energy, intensity, emotionality and aggression. In addition to distortion, a vital component of heaviness is sonic weight, which refers to CMM's low frequencies being associated with large, intense and powerful entities.

CMM's heaviness is also considered in terms of the perceived proximity of activity, apparent size of performance environment, and level and type of energy being expended. In particular, CMM provides the listener with the sense of utmost proximity to the band, usually without any significant perspective of depth.

Production strategies for achieving a high commercial standard in CMM are then presented. This is followed by a reflective commentary on the portfolio of productions, which includes discussion of the author's transition from emulative to professional level of production and considers originality within this body of work.

By presenting the subject as an important, valid and authentic scholarly discipline, this work bridges the gap between the worlds of academia and music production practice for this style.

# **Acknowledgements**

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Firstly, I would like to thank my first and second supervisors, Dr Jonathan Wakefield and Dr Rupert Till, for all their help, guidance, encouragement and support over the last few years.

I would also like to thank the publishers of the conferences, publications and the eBook in which these articles originally appeared for allowing them to be used in this way, the artists featured in the portfolio of production work who provided permission for their material to be presented in this way, and those that agreed to be interviewed.

Particular thanks go to Sam Inglis, Mark Palmer, Rosie Turner, Jeff Kitts, Jeff Singer, Ronan Macdonald, Niall W. R. Scott, Russ Russell, Andy Sneap, Katia Isakoff, Christian Havard, Phil Torpey, Ben Evans, Karl Spracklen, Steve Fenton, Sam Bennett, Godsized, For Untold Reasons, Thousand Points of Hate, Psylence, Kill 2 This, City of God, Chaos Blood, NG26, Everything for Some, Head On, Kaizen, Gone Til Winter, Nothing Gained, Ecthirion and Evocation.

# **The Publications**



## The Publications

### Conference Proceedings

**Item 1.** Mynett, M. and Wakefield, J. (2009) The use of click tracks for drum production within the Extreme Metal genre. *Proceedings of the 2009 Art of Record Production*, 13-15 November 2009, London: Association for the Study of the Art of Record Production.

### Conference Proceedings in Journals

**Item 2.** Mynett, M. (2011) Sound at Source: The Creative Practice of Re-Heading, Dampening and Drum Tuning for the Contemporary Metal Genre. *Journal on the Art of Record Production*, London: Association for the Study of the Art of Record Production. (5).

**Item 3.** Mynett, M. (2012) Achieving Intelligibility Whilst Maintaining Heaviness When Producing Contemporary Metal Music. *Journal on the Art of Record Production*, London: Association for the Study of the Art of Record Production. (6).

### Articles

**Item 4.** Mynett, M. (2009) The Sound on Sound Guide to Recording and Producing Modern Metal. *Sound on Sound*. (25) 1, pp.120-133.

**Item 5.** Mynett, M. (2009) Mixing Metal - The Sound on Sound Guide to Extreme Metal Production. *Sound on Sound*. (25) 2, pp.118-126.

**Item 6.** Mynett, M. (2010) Get the Perfect Bass. *Computer Music*. (12), pp.63-70

**Item 7.** Mynett, M. (written under the pseudonym Tenym, J. 2010) The Sound and the Fury – The Ultimate Guide to Recording Hard Rock and Extreme Metal. Part 1. *Guitar World*. (4), pp.70-78

**Item 8.** Mynett, M. (written under the pseudonym Tenym, J. 2010) The Sound and the Fury. Part 2. *Guitar World*. (5), pp.72-86

## Book Chapter

- Item 9.** Mynett, M., Till, R. and Wakefield, J. (2010), *Intelligent Equalisation Principles and Techniques for Minimising Masking when Mixing the Extreme Modern Metal Genre*. Heavy Fundametalisms: Music, Metal and Politics, Oxford: Inter-Disciplinary Press, pp.141-146.

# **The Portfolio of Productions**

## The Portfolio of Productions

- Item 10.** Kill 2 This – Mass Down Sin Drone – Plastic Head Records/USA; Abstract – 2003 \*
- Item 11.** Psylence – Through Distorted Eyes – Casket Music – 2004
- Item 12.** Everything for Some – A Thought Refused – In at the Deep End Records – 2005
- Item 13.** Kaizen - Sink – XIII Bis/Sony – 2005
- Item 14.** Thousand Points of Hate – A Scar to Mark the Day – Casket Music – 2006 †
- Item 15.** Head On - XXL –Universal - 2006
- Item 16.** Everything for Some – Identity – Casket Music – 2006
- Item 17.** Gone Til Winter – Demo - 2006
- Item 18.** City of God – A New Spiritual Mountain – Requiem Digital Media – 2007
- Item 19.** Chaos Blood – Fragments of a Shattered Skull – Siege of Amida Records – 2007 \*\*
- Item 20.** For Untold Reasons – Oubliette – Self-Released – 2008
- Item 21.** God-sized – Brothers in Arms – Self-Released – 2008
- Item 22.** God-sized – The Phony Tough and the Crazy Brave – Self-Released – 2010
- Item 23.** NG26 – Open Your Mind – Holier Than Thou Records – 2010 ††
- Item 24.** God-sized – Berzerkus – Jaegermeister Records - 2011
- Item 25.** Ecthirion – Eagle's Wings – Self Released – 2011 Ø
- Item 26.** Nothing Gained – Hollow Rhetoric – Self Released – 2012 Δ
- Item 27.** Evocation – 天靈靈地靈靈 – Self Released – 2013 Ø

All productions engineered, produced and mixed by the author, except:

† Mixed by the author.

†† Co-Mixed by the author.

\* Produced and mixed by the author.

\*\* Engineered, produced and mixed by the author, with the exception of the recording of the drums and vocals.

Ø Mixed and Mastered by the author

Δ Engineered, Produced, Mixed and Mastered by the author

# **The Audio Examples**

<http://www.soundonsound.com/sos/dec09/articles/metalaudio.htm>

## **The Interviews**

# **The Interviews**

(See Appendix 6)

Russ Russell –

10<sup>th</sup> July 2009

The Parlour Recording Studio, Kettering,  
Northamptonshire

Extreme Metal Production Masterclass Part 1. Mark Mynett talks to Russ Russell

[http://www.youtube.com/watch?v=2yOEs\\_whudo](http://www.youtube.com/watch?v=2yOEs_whudo)

Extreme Metal Production Masterclass Part 2. Mark Mynett talks to Russ Russell

[http://www.youtube.com/watch?v=14\\_ipbRzo6o&feature=relmfu](http://www.youtube.com/watch?v=14_ipbRzo6o&feature=relmfu)

Andy Sneap –

2<sup>nd</sup> October 2009

Backstage Studios, Ripley,  
Derbyshire

Extreme Metal Production Masterclass Part 3. Mark Mynett talks to Andy Sneap

<http://www.youtube.com/watch?v=GwtlcEkgu6E&feature=relmfu>

Extreme Metal Production Masterclass Part 4. Mark Mynett talks to Andy Sneap

<http://www.youtube.com/watch?v=GzvzHYOyiv8&feature=relmfu>

Steve Rooney –

One personal interview - 10<sup>th</sup> November 2012

One email interview - 6<sup>th</sup> December 2012

(See Appendix 6)

# **Introduction**



# 1. Introduction

Metal is part of the Westernised, commercial pop and rock music industry that has imposed itself on the rest of the world... metal has played and continues to play a key role in the globalised entertainment industries.

(Hill and Spracklen, 2010, p.vii)

The term 'heavy metal' was first used as an adjective relating to popular music in the late 1960s, however in the early 1970s the expression began to be employed as a noun and therefore as a descriptor for a music genre (Walser, 1993, p.7). Heavy metal, more recently referred to simply as metal, has therefore existed for approximately four decades. Given the longevity of this music's appeal, it is significant to note that there was little critical discourse of the genre prior to the early 1990s (Bennett, 2001, p.42; Phillipov, 2012, p.xi). However, in the past seven years there has been a dramatic increase in the number of academics researching and studying the area (Scott and Von Helden, 2010, p.ix). This is evidenced by the world's first scholarly conference on the metal genre, 'Heavy Fundametalisms – Music, Metal and Politics', held in Salzburg, Austria in 2008 (Sheppard, 2008). To date, the focus of this academic study has tended to address the importance and relevance of metal from a historical, sociological, anthropological, cultural, musicological and political science perspective (e.g. Weinstein, 1991; Walser, 1993; McIver, 2000, 2005; Kahn-Harris, 2007). Additionally, Weinstein points to metal studies comprehending the fields of economics, literature, communications and social psychology (Weinstein, 2011, p.243). Therefore, as Pieslak notes, the existing literature on heavy metal is mainly dedicated to its culture and transformations, rather than the music itself (Pieslak, 2008, p.35). In this work the author seeks to partially address an apparent literary gap in the scholarly study of metal music, by focusing on the processes, approaches and techniques for the sonic representation and realisation of these musical performances in recorded and mixed form. This thesis therefore extends across and beyond the limitations of many existing metal studies approaches.

Similarly, academic exploration into the processes of music production can also be viewed as being in an embryonic phase. Much of the discussion, as Howlett highlights, is "marginalised as an incidental, or peripheral observation", due to discourse often being found in texts presented from cultural theory perspectives, or those that focus on the history of recording and the impact that the arrival of recording technology had from a sociological viewpoint (Howlett, 2009, p.7). Further

to this lack of specific academic study that Howlett highlights, it is important to this thesis to note that comprehensive study into procedural methodologies for the production of contemporary metal music is “virtually non-existent” (Turner, 2012, p.ii). In amalgamation with the previously outlined metal studies perspectives, this thesis seeks to redress this issue. Hence, contemporary metal music’s common performance characteristics, sound and timbral qualities, and predominant musical practices will be placed into dialogue with the production approaches, processes and techniques that most appropriately capture and present these values.

However, due to the lack of specific literary material in the area there are, at present, no clearly defined approaches for presenting production procedures and methodologies appropriate to a particular style of music. Additionally, the distinctive and particular idiosyncrasies of the different stages and alternate approaches within music production would be largely disregarded if a singular methodological perspective was adopted and prioritised. Therefore, the critical methodology implemented for this thesis is largely interdisciplinary and often traverses disciplinary boundaries. In this respect, the analytical approach applied for this work embraces a perspective adopted in Allan F. Moore’s *Rock: The Primary Text* (2001). For the purposes of Moore’s publication, he argues, “wholesale application of a conventional academic musicology is both unwarranted and unhelpful” (Moore, 2001, p.5).

In general, however, the sensibilities of the various pre-production, engineering and recording, and mixing approaches presented here, are largely encapsulated within three levels of analysis with which one can be concerned, as codified by Jean-Jacques Nattiez in *Music and Discourse: Towards a Semiology of Music* (1990). Here, Nattiez defines analysis as a form of language that utilises differing types of discourse in its investigation of the ‘sound-object’ (Hugill, 2008, p.176). For the purposes of this thesis, the sound object can be considered as the sonic representation and realisation of musical performances in recorded and mixed form. Nattiez codifies: the immanent as referring to what essentially exists in the music; the esthetic as referring to how that music is perceived by those receiving it (Moore, 2001, p.5); and the poietic is referred to as describing the connection between the composer’s creative intentions and mental schemas, and the result of how these components influence the work’s material embodiment (Nattiez, 1990, p.92). Nattiez’s immanent level of analysis could, arguably, be considered as relating to the knowledge, and understanding, of contemporary metal music’s commonly shared performance perspectives, sounds, timbres, and practices. Nattiez’s esthetic, as well

as poetic, levels of analysis could, arguably, be considered as relating to the particular requirements of contemporary metal music's production aesthetics.

Importantly though, the focus of this thesis tends toward primary forms, rather than secondary cultural associations (Hugill, 2008, p.204). For the purposes of this work, primary forms can be viewed as the realisation of musical performances in a recorded and mixed form. Conversely, secondary cultural associations can be viewed as sociological and cultural perspectives, specifically those concentrating on reception and meaning.

This thesis will argue that the defining feature of contemporary metal music is heaviness. Therefore the first research question is: What is heaviness? This will be answered from the perspectives of primary and secondary domains. "Primary domains encompass melody and harmony, metre and rhythm; secondary domains, which 'shape' the primary, encompass texture, timbre and location" (Moore, 2012, p.29). In the instance of secondary domains, heaviness will be defined from a predominantly ecological perspective. This ecological perspective will highlight invariant properties of heaviness in contemporary metal music (CMM). Heaviness will also be defined from the perspective of perceived activity. The spatial environment that CMM productions inhabit, as well as the type, and level, of energy being expended, will therefore be conceptualised.

Once the term heaviness has been clarified, the thesis will seek to identify how CMM's heaviness can be most effectively captured, presented, and enhanced, in recorded and mixed form. Consequently the second research question is: How can heaviness be most effectively captured, presented and enhanced in the production of CMM? Key production strategies will be provided, as well as a conceptual framework for a high commercial standard of CMM production. Aspects of originality, and relevant original contributions to the academic study of record production will be highlighted in relevant areas.

A reflective commentary, which is based upon the submitted portfolio of productions, will analyse the author's development from emulation to professional practice within CMM production. Therefore, the final research question is: How can the transition from an emulative stage to a professional level of production be made?

These questions will be answered through:

- Critical writing on CMM production in professional outputs that have standing in the field of music technology and production, and the audio examples included with these outputs.
- The Art of Record Production conference and journal publications.
- The Fundametalisms book chapter.
- Informal, but semi-structured field interviews with:
  - Two of CMM's key producers.
  - The guitarist/vocalist and drummer from Machine Head, a well-known contemporary metal band.
  - A contemporary metal session drummer, lecturer and magazine artist/columnist.
- The author's critical evaluation, and reflective commentary, on his decade of engineering, production and mixing work within the style, partly informed through collaborating with prolific producers from the field.
- The pieces of music submitted in the portfolio of the author's productions that, in addition to being employed to demonstrate significant performance perspectives, evidence the development and application of many of the approaches, processes and techniques presented in this thesis.
- The overarching empirical and analytical framework provided by this synoptic commentary.

The processes involved when producing CMM will be divided into three major stages. The first of these stages concerns the role, nature, approaches and processes of pre-production. This can be viewed as the practice of designing the ensuing project's blueprint, and therefore is often considered to be the cornerstone of a successful end product. The second stage concerns the engineering and recording stage of music production for the style. This not only requires technical knowledge and understanding of the equipment, but also finely honed listening skills and musical understanding of the tonalities and performances involved. The third and final major stage will be the mixing process, which has a significant impact on the way a final production is perceived, and relates to the way music is balanced, panned, equalised, processed and effected. The mastering stage of music production, as well as surround formats, is beyond the scope of this body of work.

The research will demonstrate how essential is the concept of performance precision and overall tightness, and the approaches that most effectively enable and capture this. It will show that, in some instances, the perception of precision can be created, or 'built', when the actual performance events are sub-standard in this respect. The research will analyse and present the approaches and techniques for most appropriately engineering and recording the instrumentation involved. Here, a central focus is on ensuring that the essential sonic element of 'heaviness' is captured, whilst retaining and facilitating clarity and definition. Specific challenges due to the style of performance and textures involved, for example the frequently complex and intense bass drum performances, and dense, down-tuned bass and rhythm guitar timbres, will be investigated and discussed. The critical analysis will also provide discussion on the techniques, approaches and processes required to accomplish a high commercial standard of production at the mixing stage. In addition to presenting ever-increasing standards of performance precision and overall tightness, the principal production objectives are heaviness and weight combined with an emphasis on the definition and intelligibility of the instrumentation involved. This is fundamental to retaining and providing a high level of sonic clarity for these often complex performances and advanced levels of musicianship. Mixing for the style will usually feature the use of drum samples to replace or reinforce. Additionally, a high overall level of editing at source, drum gating, corrective and creative equalisation, compression, and in some areas, effects processing, are likely to be used. The more radical use of these techniques, when compared to other styles of rock music containing similar instrumentation, frequently provides scope for input from the producer or mixer's perspective. Furthermore, research, analysis and discussion of contemporary metal's commonly shared performance perspectives, sounds and practices will be provided. These are primarily presented to highlight the explicit relevance that the procedural production methodologies imparted in the publications have to these performance qualities and sonic characteristics.

In addition to providing intellectual value that furthers the field of record production as an important, valid and authentic scholarly field of study, this body of work aims to provide considerable practical value from two separate perspectives. Firstly as a resource for students and lecturers in the area of music technology and production; secondly for novice practitioners through to professional engineers and producers, who may wish to enhance their knowledge of the relevant approaches, processes and techniques appropriate to this music's production. Consequently, this thesis

additionally seeks to bridge the gap between the worlds of academia and music production practice for this style.

The purpose of this commentary is to place the various publications into the context of an overarching analytical framework, to demonstrate their collective coherence, and to provide a significant degree of continuity by highlighting the links between each.

# **Literature Review**

## **2. Literature Review**

To date, the majority of published work on metal music has been from a historical, sociological, cultural, political and musicological perspective. In contrast, there has been little comprehensive academic study of the numerous specific challenges in the audio production aesthetics of contemporary metal music (CMM). Despite this, there is a number of key music engineering and production texts, which, although not directly focused on the subject area of this work, still have considerable relevance to many of the approaches, techniques and processes being presented.

This literature review will therefore be organised thematically; firstly discussing the historical, sociological, cultural, political and musicological texts that have metal music as the primary focal point; secondly listing appropriate texts on engineering, recording and production; thirdly discussing texts focused on mixing, fourthly, examining ecological psychology, and musicological texts, that consider timbre, location and perceived activity. Although a number of these publications will span more than one theme, they will only be listed once, in whichever section is most appropriate.

### **2.1 History, Sociology, Culture, Politics and Musicology**

In order to provide a complete and comprehensive music production methodology for contemporary metal, it is important to present an overarching theoretical framework and contextual basis for this music. To do so, it is essential to gain an understanding of the history and evolution of metal music, and to comprehend the sociological, cultural, musicological, political and stylistic differences that are perceived as distinguishing the high number of metal subgenres.

Weinstein's (1991) pioneering sociological publication provides analysis and discourse on the advent of heavy metal music in the early 1970s, and the social climate in which it developed and flourished, through to its evolution and fragmentation into numerous subgenres in the 1980s. The focus is predominantly consumer-led, and is considered by many to be the first fully scholarly work on metal (Brown, 2011, pp.215-216). In contrast, Walser (1993) provides a thorough analysis of heavy metal from more of a performer-led, musicological and cultural perspective whilst discussing identity, community and gender. Weinstein and Walser's seminal



publications were written approximately two decades ago. Kahn-Harris (2007) continues the sociological study of heavy metal from where Weinstein and Walser's studies close, but mainly focuses on areas of CMM that reside outside of the more mainstream music industry. This text provides a particularly comprehensive cultural and sociological investigation of the multifaceted organisation of the extreme metal scene's radical subgenres, often by drawing on primary research with band members and fans from around the world. Similarly, again concentrating on the more extreme side of metal, Phillipov's (2012) *Death Metal and Music Criticism: Analysis at the Limits*, offers an account of the listening pleasures of death metal's sonic and lyrical extremity. As well as evaluating metal scholarship, discussion of the musical conventions of death metal is provided. Examples include technical complexity requiring skill and proficiency of musicianship, guttural vocal styles, blast beats and unpredictable song forms. One of the text's areas of discourse relates to political concerns. Phillipov highlights metal music's failure to fully engage with political questions and values, as the primary reason that it has been "subject to far less, and far less favorable, critical attention. This has so far served to limit our understandings of its musical and cultural meanings" (Phillipov, 2012, p.17).

Elsewhere, there are numerous pertinent studies of the specific major metal subgenres; Thrash Metal (Sharpe-Young, 2007; Ernst, 2008), New Wave of American Heavy Metal (Sharpe-Young, 2005), Extreme Metal (McIver, 2000, 2005; Mudrian 2009), Nu-Metal (McIver, 2002), Death Metal (Purcell, 2003; Mudrian, 2004; Sharpe-Young, 2008), Black Metal (Moynihan and Söderlind, 1998) with an overview provided by Frieson and Epstein (1994). Other studies have focused on specific metal subgenre's links with specific countries or regions; Norway and Black Metal (Beste and Kegelberg, 2008), Northern England, Northern Europe and Black Metal (Lucas et al, 2011), Sweden and Death Metal (Ekeröth, 2008) and Britain and Heavy Metal (Bayer, 2009). Additionally there are historical, fan culture and encyclopaedic approaches (Jasper, 1985; Straw 1993; Arnett, 1996; Sharpe-Young 2001, 2003a, 2003b; Konow, 2002; Bukszpan and Dio, 2003; Christe, 2004; Phillips and Cogan, 2009; Jones, 2011), studies of specific artists such as Metallica (Pillsbury, 2006) and an analysis of the influence that classical music has had on metal music in general, as well as specific guitarists such as Randy Rhoads (Walser, 1992). As well as providing a wealth of knowledge about various fan cultures around the world, and various acts and their history, these publications collectively provide highly comprehensive analysis and discussion of the evolution of metal's considerable number of subgenres. These provide critical understanding of the perspectives and

terminology of the perceived characteristics that differentiate these approaches. However, existing definitions of these subgenres are very much a subject of debate, with many bands and fans feeling they are useless and unnecessary, due to how vague or limiting they can be (Kahn-Harris, 2007).

Perhaps reflecting the diversity of scholarly metal studies in recent years, which Phillipov suggests is a reflection of increasing diversity of the audience itself (Phillipov, 2012, p.59), are studies which have explored religious and spiritual aspects (e.g. Cordero, 2009; Luhr, 2005; Martens 2005; Moberg, 2008), as well as its literary, classical, mythological and historical references (e.g., Bardine, 2009; Campbell 2009; Trafford and Pluskowski, 2007).

Focused on the social cultures of metal, jazz and rock in Ohio, Berger (1999b) takes an ethnographic approach, employing extensive interviews and musical analysis, to highlight the manner in which those involved in these music scenes derive and share meaning. Similarly discussing meaning, Pieslak (2008) focuses on the examination of sound, text and identity in the metal band Korn. However, Pieslak also discusses the development of metal's subgenres and highlights the tensions that exist between the bands and fans of these differing subgenres. Decisions of performance, timbre, pitch and composition in a Korn song are then examined. Pieslak (2007) provides a comprehensive study of the rhythm and meter of Swedish metal act Meshuggah. Pieslak proposes that Meshuggah reveal, "distinct rhythmic and metric structure based on large-scale odd time signatures, mixed meter, and metric superimposition" (Pieslak, 2007, p.219). This "deviates from the norm of common-time meter typical of songs in other metal subgenres" (Pieslak, 2007, p.244). However, these techniques are largely specific to Meshuggah's music.

Specifically concerned with the production of rock music, and therefore of strong relevance to this body of work, is Zak's (2001) *The Poetics of Rock: Cutting Tracks, Making Records*. This text discusses the skills required from composers, musicians, engineers and producers to enable a successful project and examines the impact of recording technologies on the production of rock music. This draws attention to the ways in which the processes of composition and recording have become intertwined. Zak also analyses the relationship between the artists' live performance and the documentation of this within studio recordings. It observes that rock and metal productions strive for a live feel despite the fact that, in reality, there are minimal performances contained in them that could strictly be considered as live. Musical

examples and engaging contributions from artists and world-renowned producers, such as Tom Lord-Alge, Rick Rubin, Andy Wallace and Butch Vig, provide context to these topics. Also focusing on rock music, Grayck (1996) presents the performance style as a distinct artistic medium. This perspective could be applied to metal music. Grayck also discusses how rock music has been mediated by technology, and argues that its recorded form is worthy of the prestige frequently provided to classical or jazz music.

Brian Moore (2003) in *An Introduction to the Psychology of Hearing* focuses on the field of auditory perception and hearing sciences, as well as speech perception and audiology. It clearly explains the key concepts and mechanisms that are fundamental to auditory perception, such as loudness/space/pattern/speech and pitch perception, the structure and function of the ear, and frequency selectivity. A better understanding of concepts such as masking and abnormalities in the perception, and absolute thresholds, of loudness can assist when mixing CMM.

Allan F. Moore's (2001) *Rock: The Primary Text* is highly pertinent to this work, taking rock music's aesthetics and sounds as its primary focus of attention. Analysis is given to self-expression within the medium, and exploration of the background to the genre from the early 1960s blues and African/American influences through to more progressive and jazz influenced rock, as well as punk, glam rock, as well as hard rock and metal, which are suggested to be "points on a style continuum" (Moore, 2001, p.148), with the latter being highlighted as "the rock style that permits the subtlest play of significances", due to being the "most formulaic of rock styles" (Moore, 2001, p.150). Discussion is additionally given to the stylistic and compositional developments throughout these changes.

Moorefield (2005) focuses on a subject also analysed by Zak (2001), which is the convergence of producer and composer into the same role. In discussing the studio as a musical instrument, Moorefield presents numerous case studies from Pink Floyd's 'Dark Side of the Moon' through to Trent Reznor, and highlights how the producer has now taken centre stage in many respects.

Frith (1996) presents a compelling justification for popular culture studies. As well as discussing aesthetics and the meaning of music, he presents discourse on the rules of certain genres, lyrical content, vocals and performance aesthetics, as well as providing discussion on the impact of technology. Here, Frith analyses the

development of musical storage and retrieval, from music stored in the body and only retrieved through performance, through to access to music in the late 20<sup>th</sup> Century, and the democratisation of music production.

## **2.2 Engineering, Recording and Production**

At present there are no specific publications that provide an empirical methodology for the pre-production, engineering and mixing approaches, techniques and processes behind the production of CMM.

Reyes' (2008) thesis is only relevant to the focus of this work in a few small areas. This is due to the thesis concentrating on the technological dispositions of heavy music production from a media and cultural studies point of view. Consequently, little analysis is given to the actual music production processes involved in CMM production, and to quote from this dissertation's abstract:

This dissertation documents and theorizes cases of 'heavy' music production in terms of their unique technological dispositions. The project puts media and cultural studies into conversation with constructivist approaches to technology by looking at the material practices behind such styles as Punk, Hardcore, Metal, and Industrial.  
(Reyes, 2008, p.iv)

At present, there is a lack of any comprehensive scholarly study into the specific processes, approaches and techniques for capturing and facilitating the primary qualities of CMM when produced to a high commercial standard. Examples of these qualities include performance precision, heaviness and sonic weight, and overall clarity. However, there is an extensive number of published books on engineering, recording and production in general.

Those that have the highest degree of relevance and quality include Moylan (2007). As well as presenting in-depth discourse on the art of recording in general, this text also provides comprehensive discussion on listening skills and evaluation of sound quality, which are areas highly pertinent to this work. Huber and Runstein (2005) present an enlightening study of sound and hearing, with a highly accessible analysis of waveform characteristics and harmonic content. Rumsey and McCormick (2009) explain auditory perception in addition to detailed chapters on loudspeakers including discussion of phase, directivity and positioning. Of particular interest are the

succinct sections on room gain and phantom stereo images when placing bass and guitar cabinets close to walls, and the potential impact of high frequency 'splash' which can be caused by hard surfaces.

Of the publications reviewed in this section, Owsinski (2009) has perhaps the highest level of vocational relevance to current engineering practice. As well as being a commendable all-round reference resource on recording, it also presents analysis on less conventional recording methods. The book's other main strength for this research was the interviews it contains, which were carried out with a wide range of professional recording engineers. These included Steve Albini, Michael Beinhorn and Eddie Kramer, as well as contributions from Los Angeles drum doctor Ross Garfield.

Huntley-Parsons (1997) writes mainly from, and for, the drummer's perspective of the recording process, providing a field-guide for facilitating the highest standard drum recordings. Also concentrating on drums, but focusing on drum re-heading, dampening, tuning and achieving the right sound at source, Schroedl (2002) provides practical discussion and advice.

Comprised almost entirely of interviews with top producers, Massey (2000) provides engaging insight into the perspectives and opinions of luminaries including George Martin, Brian Wilson, Eddie Kramer, Mike Clink and Keith Olsen. Of note, is the fact that these producers actually agree on very few issues, other than the principle of getting sounds right at source. Despite this, the discourse provided by these practitioners is often highly informative. Additionally, the various producers within this text frequently discuss recording studios and digital audio workstations using language and terminology that highlight them as musical instruments in their own right. This is a subject also approached by many other writers (Frith, 1996; Theberge 1997, 2004; Toynbee 2000; Zak, 2001; Schmidt Horning 2004). This has relevance to many of the editing and production techniques required to provide CMM productions with the requisite performance precision and overall tightness - often placing the producer as performer.

Farinella (2006), although focusing on the more commercial side of the pop music industry, provides discourse on the more person-centred skills required of record producers. For example discussion on creating the vibe and how to get the best out of performers, dealing with difficult personalities and dealing with band dynamics, all of which are part of the essential range of skills required of a producer. Burgess's

(2002) *The Art of Music Production* provides a comprehensive portrait of the recording industry from a producer's perspective and includes analysis on the impact of technological developments in the area, as well as advice on how to deal with artists. These areas of discussion informed the author's work as a producer.

Other publications that are also worthy of mention regarding the engineering and recording processes are Talbot-Smith (1997), Brice (2001) and Eargle (2003) providing discussion of digital audio, recording consoles, amplifiers and loudspeakers. Whitaker (2003) provides discussion of audio measurement and analysis, as well as audio phase and frequency measurement and Bartlett, B. and Bartlett, J. (2005) provide more practical perspectives on music production.

Dochtermann (2011) starts by providing some analysis on the historical perspectives of music production, discussing innovators such as Les Paul, Phil Spector and Brian Eno. An engaging chapter focusing on music production perspectives also complements the practical analysis of microphones and microphone technique, again informing the author's production work.

## **2.3 Mixing**

In contrast to the number of publications concentrating on the engineering and recording side of audio production, there are relatively few that are focused on the subject of mixing, and even fewer dedicated specifically to the arena of CMM.

Turner (2012) provides discourse highly relevant to this thesis. Analysis and discussion of the processing approaches employed by acclaimed metal producer Andy Sneap are provided. Turner's research is facilitated through gaining access to the final session file of a mix, which was completed entirely within the Pro Tools digital environment. The thesis focuses primarily on Sneap's use of compression, panorama and sample augmentation, as well as his exaggerated approaches to equalisation. These four elements are analysed and directly related to the inherent problems with mixing extreme metal genres, with some of these issues being seemingly less present in other genres of popular music (Turner, 2012, p.5).

With a more generalised focus, but still providing analysis and reference to many of the techniques pertinent to metal production, Izhaki (2007) provides comprehensive and informative discussion. In addition to a highly relevant discourse

on techniques such as serial compression, specific reference to metal production is made in the 'Equalizers' chapter. *The Mixing Engineer's Handbook* (Owsinski, 1999) also provides significant and comprehensive discussion on equalisation and compression. It also discusses the setting of compression parameters for particular results, as well as presenting a comprehensive analysis of the frequency bands and the critical frequencies of various instruments. Additionally, the six key elements of a mix; balance, frequency range, panorama, dimension, dynamics and interest are individually analysed and discussed. In many instances this is achieved through contributions from numerous renowned mixers, including Lee DeCarlo, Andy Johns and Guy Snider.

Worthy of specific discussion is Hodgson's highly informative *Understanding Records: A Field Guide to Recording Practice* (2010), which mainly focuses on the technological elements of recording and mixing music. This includes in-depth discussion of signal processing and mixing where Hodgson highlights contemporary metal subgenres as presenting exceptions to the musical convention of foregrounded vocals, which he suggests will "reinforce the perceived loudness of productions" (Hodgson, 2010, p.181).

Droney (2003) makes comprehensive use of engineer/producer perspectives and features twenty-seven practical and informative interviews with platinum-selling engineers including Dave Jerden and Alan Moulder. This text provides real-world outlooks on general production principles right through to more specific and explicit techniques, for example the use of specific outboard or digital processing products for certain results, and the detailed discussion of the frequency content of individual drums.

Devoted to the most important signal processing and effects used for mixing, Case (2007) provides a comprehensive research resource, aimed at providing the reader with the information needed to most creatively and effectively apply these tools. The highly detailed chapter on compression and limiting is of particular relevance. Extensive discussion of attack and release settings and their impact on each other is provided, with additional analysis on how different compressors implement these parameters in dramatically varying ways. This was of particular interest to the author, enabling a more informed, and considered, approach to the implementation of attack and release settings, and compression generally. Highly informative and accessible chapters dedicated to distortion, equalisation, expansion

and gating, time effects, pitch shift, as well as reverb are also provided. Case frequently refers to milestone music productions, and additionally provides the experiences of prominent, highly experienced, producers and mixers.

Gibson's (2005) *The Art of Mixing* discusses the effects and processing used in most popular music productions. This differs from other publications on the subject of mixing by providing visual representations of the apparent volumes, as well as pan positions, of sounds and instrumentation involved with various mixing styles, including metal. Gibson provides discussion of natural panning of the drum kit and overall instrumentation, as well as symmetrical and asymmetrical panning, stereo fattening and detailed discussion of the implications and functions of reverb, and how it impacts on space and depth within the mix field.

*Mixing Secrets for the Small Studio* (Senior, 2011) also provides comprehensive discussion of the core audio mixing principles and processes. This is prefaced with a number of chapters on 'Hearing and Listening', which mainly discuss monitoring and environmental implications, and 'Mix Preparation', covering, for example, timing and tuning adjustments, as well as 'comping' and arrangement.

Despite mastering being beyond the remit of this thesis, the qualities that make a high standard mix from a mastering perspective is relevant to this work and Owsinski (2000) and Katz (2002) provide authoritative discussion on this subject.

## **2.4 Ecological Perception, Timbre, Location and Perceived Activity**

Ecological psychology is concerned with the consciousness and behaviour of organisms in a living environment. Focused on ecological perception and mainly concentrating on the visual, Gibson's (1979) publication proposes a radically altered theory of perception. Highly critical of traditional perceptual theory, particularly cognitivism, Gibson puts forward a theory of direct perception and direct realism, based on the concept of affordance. Affordance constitutes "a radical hypothesis, for it implies that 'values' and 'meanings' of things in the environment can be directly perceived" (Gibson, 1979, p.127). This model therefore rejects the information processing view of cognition, claiming that meaning is often specified in the environment itself, and therefore that perception and meaning are closely connected.



Gibson's work is highly influential to many post-cognivist contemporary psychology movements.

Eric Clarke (2005) examines the way in which Gibson's ecological approach to visual perception can be developed for the auditory domain. Consequently, Clarke presents a theory of musical listening and meaning. He argues against structural analysis stating, "the experience of musical meaning is fundamentally – though not exclusively – a perceptual experience" (Clarke, 2005, p.8). A central notion of the publication is that invariants in the environment contribute to musical interpretation and meaning. Therefore, the way we listen to, and ultimately perceive, a musical event, should be considered from physical contexts, rather than purely cultural perspectives.

Zagorski-Thomas (2012) aims to bridge the divide between the technical and creative procedures of musical creation and the manner in which listeners engage with music to create meaning. Certain universal meanings in sound, from the perspective of ecological perception, are considered, as well as those that are socially and culturally constructed. Examples involving the perception of intimacy and space, as well as types and levels of energy are provided. These perspectives are highly relevant to this work's discussion of the secondary domain. Conversely, cultural domains, such as the 'rules' of mixing certain music genres, are contemplated, as are social fields, for instance sounds that are generic markers of particular styles such as distorted punk rock guitars.

Timbre is a broad term relating to the overall essential quality and distinguishable characteristics of a tone, thereby making a sound what it is. Fales (2002) provides challenging research into the concept of timbre, explaining the complexities involved with the language required to describe this dimension, stating that, as timbre has "no domain specific adjectives" then it "must be described in metaphor or by analogy to other senses" (Fales, 2002, p.57). Focusing on heavy metal guitar timbres throughout the past four decades, and therefore highly relevant to this thesis, is Berger and Fales' (2005) musicological study. Despite failing to discuss the down-tuned timbres prevalent in most CMM, it provides credible conclusions concerning the changing perceptions of heaviness for metal guitar timbres. The text analyses the impact of distortion levels and use of equalisation for these sounds and provides analysis of how these help shape and define certain metal subgenres, in addition to the relevant style of performance. Waksman (2004) analyses the importance of

guitar timbres to musical identity and argues that many guitarists are recognisable by their sound, as much as their playing style. Waksman analyses equipment choice, signal chain and methods of equipment modification, and presents case studies in the form of Eddie Van Halen and Greg Ginn, from the hardcore act Black Flag.

Focusing on the Kings of Leon (2008) track 'Sex on Fire', Zagorski-Thomas (2014a) focuses on rhythm and timbre, in preference to harmony and melody. Due to CMM's intensity and intricacy of rhythmic treatment, and emphasis of timbre and texture, this form of analysis is more meaningful and relevant to this thesis than traditional musicological approaches. Spatial staging, gestural movements and the interactions between the performers are examined. Zagorski-Thomas investigates how certain interpretations of the song may be based on the embodied experience of being human, whilst other elements may require prior experience that is culturally specific.

Tagg (1992) embraces methodologies and theories generated outside of musicology, many of which are significant to this thesis' consideration of ecological perception and timbre. He discusses patterns of socialisation that relate directly to non-verbal sound, and how this is so important to the construction of our emotional personality. Tagg then goes on to discuss the expressive qualities of traditional metal music from an urban soundscape perspective. Subjective 'readings' of the city soundscape are contemplated, and diametrically opposed interpretations presented. The author argues that the difference between cultures and economies can impact on the underprivileged, appropriating metal music's noise as this appropriates and re-creates the city's sonic environment. However, the high diversity of metal music listeners is marginalised, and due to the publication being two decades old, Tagg's reference to considerable amounts of reverb being added to metal recordings is not relevant to CMM.

Zagorski-Thomas (2010) analyses the subject of ambience and perceived location in music production. Here, the subject of functional staging is discussed, which is when the staging of sounds "is related to the practicalities of audience reception rather than to aesthetics" (Zagorski-Thomas, 2010, p.1). Zagorski-Thomas contrasts the staging of rock and dance music, and relates this to the manner in which the different audiences tend to receive each. Usually smaller and less ambient home

environments in the case of rock (and, for the purposes of this research, metal music), compared with large nightclub P.A. systems in the case of dance music.

Despite giving minimal specific discussion to the producer's role in their creation, Alan F. Moore's (2012) publication focuses not on *what* songs actually seem to mean, but on *how* they mean. To enable understanding of the means, or construction, by which songs present meaning, he sets out the separate, but interdependent, analytical categories of shape, form and delivery. The quality of 'shape' addresses instrumentation and sound sources within the three classifications of functional layers, the soundbox and timbre. These three categories are highly relevant to this work's discussion of secondary domains. The quality of 'form' relates to more traditional musicological perspectives of content, such as rhythmic patterns, metre, modes and melodic structure. Many of these perspectives are discussed in Appendix 3 for this thesis. 'Delivery' is concerned with the manner in which a persona is communicated to the listener, for example through the interaction of lyrics and the singer's particular treatment of melody.

Using the allegory of 'Sonic Cartoons', Zagorski-Thomas (2014b) considers improved realism, or schematic versions of reality, that has been enabled by technological advancements in music production. He proposes that:

Record production is continually looking for strategies to allow it to clean up the messiness of reality: to thin out reverberation to create the sense of space without the muddiness, to suggest the low frequency power of a large space without the loss of definition, to exaggerate the intimacy of closeness with microphone and processing techniques, or to create artificially spread out and wide stereo images of ensembles.  
(Zagorski-Thomas, 2014b, p.9)

The qualities of low frequency power, definition, intimacy and wide stereo images, referred to in this quote, are all highly relevant to CMM production - as is the concept of cleaning up the 'messiness of reality'. CMM production usually seeks to minimise the auditory characteristics of the performance environment, and present a 'dry' spatial signature. Therefore the novel, but imaginary, representations of performance discussed in this publication are pertinent to this thesis.

Wallach (2003) theorises the properties and possibilities of recorded music as cultural objects in social life. Discussing the way that listening to music produces meaningful effects, Wallach refers to the way that sound often indexes a sound

source or sound producer, and that this experience can literally move the listener. The paper presents extensive discussion on the severed link between sight and sound when listening to music, and links this to listener identification. These perspectives provide relevance to this commentary's consideration of perceived location and activity.

Zagorski-Thomas (2008) provokes discourse on the musicology of record production, and aims to establish it as a valid and important area of study. He proposes an outline structure for a musicology of record production separated into six sections: "the development of technology; staging; ergonomics and embodiment; training and practice; the negotiation between performance practice and recording practice; and consumer influence" (Zagorski-Thomas, 2008, p.189). Areas discussed by Zagorski-Thomas that are specific to this research include analysis of close microphone placement, and the amplification of high frequency content, "to suggest intimacy and proximity" (Zagorski-Thomas, 2008, p.194), both of which will usually feature heavily in the production processes of metal music.

Primarily focused on analysis of the spatial perspectives of sound recordings, Moore and Dockwray (2008) make use of the soundbox concept that acknowledges the existence of the four dimensions: laterality, register, prominence and temporal continuity. The publication contextualises music production in the positioning of sound sources across these dimensions, and from this perspective classifies various types. Also concentrating on space in recordings, Doyle (2006) looks at the first six decades of the 20<sup>th</sup> century, and particularly 1950s rock and roll recordings, and examines their spatiality and how this was sonically created. The publication aims to explain the rationale behind the use of echo and reverberation effects, while explaining their cultural signification. Doyle also discusses spatially dry music productions from the 1920s and 1930s, referring to these as providing a 'realist' perspective, which don't provide any sonic clues as to the ambient characteristics of the recording environment. Minimising the physico-spatial conditions of the site of performance, combined with highly limited use of reverb, is typical of CMM production.

From the perspective of perceived activity, CMM production frequently features heavy editing and the artificial construction of performances, most usually to provide the perception of precision and overall tightness. However, this brings into question the subject of authenticity, which is analysed by Allan F. Moore (2002). This text,

which focuses mainly on rock and contemporary folk music, asks who is ascribing the concept of authenticity, rather than asking 'what' piece of music or performance is being authenticated. This relates to Moore's argument that authenticity is a subject linked to interpretation, as authenticity is not inherent in any combination of sounds or musical instruments (Moore, 2002, p.210).

Focusing on performance practice and perceived activity, Zagorski-Thomas (2007) discusses micro-timing and groove, focusing on performance, consciousness and group dynamics. This is with a view to highlighting "several ways in which the study of the micro-structural aspects of the musical surface can be related to perceived meaning for both performers and listeners" (Zagorski-Thomas, 2007, p.333). Although precision can often be viewed as more important to metal music performances than groove, this text assists with eliciting meaning and context for both the artists and audience from this perspective.

## **Heaviness in the Secondary Domain**

### **3. Heaviness in the Secondary Domain**

The notion of CMM's 'sound', in the form of texture and timbre, provides the music with fundamental identity. The defining and essential feature of this sound is the subjective quality 'heaviness'. Within this musical context, the word 'heaviness' becomes a discursive category that implies a collection of sonic characteristics and compositional, or performative, elements.

The following discussion aims to define what is usually referred to as heaviness from two separate perspectives. These perspectives relate to secondary domains, rather than primary domains that are the focus of Appendix 3. Primary domains are concerned with tempo, metre, rhythm, melody and harmony. Secondary domains, which 'shape' these primary domains, involve texture, timbre and location (Moore, 2012, p.29).

Firstly, heaviness will be defined from a predominantly ecological perspective. This will enable an inevitable interpretation of CMM's heaviness. Secondly, heaviness will be defined through the lens of perceived activity. The spatial performance environment that CMM productions inhabit will therefore be conceptualised, as well as the type, and level, of energy being expended.

#### **3.1 Ecological Perception**

The ecological approach emphasises the relationship between organisms and their environment. It proposes the theory of direct perception, due to inherent interpretations that are formed from certain kinds of stimuli or environment. By doing so, the contention of potentially countless individual interpretations that can be associated with secondary cultural associations can be averted. As Alan Moore proposes "Much detailed writing on music contents itself with sophisticated description, and analysis...but it is also worth keeping an eye on pragmatic reality" (Moore, 2012, p.285). It is this 'pragmatic reality' with which ecological perspectives are concerned.

This thesis tends toward primary forms, and therefore ecological perception is considered with regard to reception and meaning. This is a position that largely

negates secondary cultural, or sociological, perspectives and associations (Moore, 2012).

James J. Gibson (1979) initially formulated the concept of ecological perception, principally through his publication *'The Ecological Approach to Visual Perception'*. In this respect, Gibson proposes arguments of direct realism and perception, rather than the indirect realism associated with cognitive, information-processing style perspectives. Eric Clarke (2005) reconceived Gibson's ecological approach and related this to musical analysis and discourse in his publication *'Ways of Listening'*. Discussing these invariant properties that relate to sound, Moore suggests:

Ecological perception can be characterized most simply by the phrase invariants afford through specifications. An ecological approach identifies invariants that are perceived in the environment. In the case of music, this environment is purely sonic. Such an approach then observes what responses these invariants afford, and it thus promotes action on the basis of the source the sound is (not necessarily consciously) interpreted as specifying.  
(Moore, 2012, p.12)

Zagorski-Thomas similarly proposes that certain facets of a world with consistent physical laws, as interpreted through our bodies, are "immutable and universal because the experience of existing within a human body forces some types of interpretation upon us" (Zagorski-Thomas, 2012, p.2).

This concept of inherent interpretation, and fixed decoding, as experienced within our existence inside a human body, will inform the following discussion related to perceptions of heaviness.

### **3.2 Heaviness and Ecological Perception**

Babies are endowed with nonverbal vocal talents totally out of proportion to other aspects of their size, weight and volume: they have inordinate lung power and vocal chords of steel, it seems, capable of producing high decibel and transient values.  
(Tagg, 1992, p.1)

Most humans start to hear four months before birth, following which our aural capabilities are already highly developed (Tagg, 1992, p.1). These aural abilities enable the successful early-use of pedagogical methods involving music and melody. Examples here include the effective enhancement of mathematics and alphabet



retention through the use of rhythm and melody, and nursery rhymes that are not only used as a creative activity, but to teach vocabulary through meter and rhyme. Therefore, given that a functioning voice box and speech capabilities are present, the way we listen to, and interpret, music and its myriad timbres, is heavily bound to this knowledge and experience of oral sound. These ideas are supported by Wallach, who refers to a “model of culture that views linguistic signification as the primary determinant of cultural experience” (Wallach, 2003, p.36). Additionally, Moore states, “The way listeners listen is greatly determined by whatever bodily knowledge they have of producing music” (Moore, 2012, p.4), and Middleton refers to “the voice, in its commonly understood significance as the profoundest mark of the human” (Middleton, 1990, p.262).

During early stages of development, non-verbal sounds are essential, and it is here, under normal circumstances, that an inherent association between volume and distortion will start to be formed. As the capabilities of human vocal chords are transcended, normally through excessive volume or power, audible vocal distortion is produced (Walser, 1993, p.42). This excessive volume often accompanies high degrees of energy and emotionality. In many associated instances, such as those related to pain, hunger or separation anxiety, infants will experience these high degrees of emotionality as intense. In subsequent years, as soon as a concept of aggression is understood, associations between distortion and aggression will also be made. Hence, from an early age, distortion starts to function as a sign of volume, power, energy, aggression, intensity and emotionality.

Moving from ecological perceptions to a production perspective, this link between distortion and volume is also identified by Moore, who states, “if a producer wishes to bring a sound forward, to appear closer to the listener, rather than make it louder, they will tend to add a small amount of distortion” (Moore, 2012, p.37). Discussing distortion, Case proposes,

Fans of many, if not most, styles of popular music react positively to distortion almost instinctively. When a device is overloaded, something exciting must be happening...there is something visceral and stimulating about distortion that makes the music more exciting”  
(Case, 2007, pp.97-150)

These sentiments from Case relate particularly to metal music where “the most important aural sign...is the sound of an extremely distorted electric guitar” (Walser,

1993, p.41). Furthermore, distortion creates potentially unlimited sustain in electric guitars due to signal compression. As exertion is normally required for sustaining any physical activity, distorted electric guitar sounds also signal energy and power “through this temporal display of unflagging capacity for emission” (Walser, 1993, p.42).

In addition to the radical harmonic distortion in its guitar timbres, CMM is likely to present numerous other audio sources with distorted characteristics. As discussed in publications 4, 5, 6, 7 and 8, elements of highly distorted bass signals are a regular feature of CMM’s composite bass timbres. Additionally, CMM’s vocal performances tend to embody physical effort and aggression, and are often so heavily distorted and guttural as to fail to present any distinguishable note or pitch (Berger, 1999a, p.164). Lastly, high levels of signal compression normally used throughout the mixing and mastering stage of CMM often generate related harmonics. In addition to providing consistently louder volume levels, this compression often creates a desirable form of harmonic distortion (Case, 2007, p.150).

Therefore, CMM’s defining and essential feature of ‘heaviness’ is primarily substantiated through its displays of distortion. Regardless of the listening levels involved, the fundamentals of this identity, from an ecological perspective, are inherently linked to volume, power, energy, intensity, emotionality and aggression.

### **3.3 The Perceived Size of the Sounds and Perceived Proximity of the Activity**

Analysis of the spatial elements of popular music recordings can be made by way of the ‘sound-box’, a concept that acknowledges the way sound sources are perceived to exist in four dimensions: laterality, register, prominence, and temporal continuity.  
(Moore & Dockwray, 2008, p.219)

Continuing firstly from the position of ecological perception, the following discourse will engage with CMM’s sounds as perceived within the sound box’s four dimensions. These four dimensions will be utilised to relate directly how this style of production aims to impart a schematic representation of performance in a perceived spatial environment. Whereas Moore uses the terms laterality, prominence, register and temporal continuity, the author will utilise: stereo placement as referring to laterality; and degree of foregrounding, proximity and depth/ambient characteristics

as referring to prominence. The way that sounds, and their frequency content, are perceived as occupying space on the vertical plane will refer to the dimension register. Lastly, the static nature, or otherwise, of sound placement through time within these three spatial dimensions will refer to temporal continuity.

### **3.4. Sonic Weight**

Low frequency content is highly relevant to the concept of sonic weight, which is an essential element of CMM's heaviness. Enhancing low frequency content in the pursuit of heaviness is a principal feature of CMM. For example, down tuning is often considered to be a pre-requisite for the music's overall sonic impact. The most common of these down tunings involve the lowest/thickest string being tuned to a 'C' or 'B'. This is four or five semi tones, respectively, lower than this string would normally be pitched, and provides greatly enhanced low frequency content due to the resulting lower fundamentals. Low frequency content is additionally provided by the way CMM's guitars and bass sounds are amplified with accentuated low frequencies.

The world we inhabit has consistent physical laws, and these laws afford invariants as to how we perceive low and high frequency sounds within this environment. Lower frequencies are "created by larger, more powerful entities than high frequency sounds" and therefore, our "association of loud low frequency sound with power becomes a matter of ecology rather than culture" (Zagorski-Thomas, 2014a, p.8).

Additionally, low frequencies are associated with high levels of both energy expenditure and intensity of performance. This is due to inherent associations that originate from "our basic experience of what sorts of noises are produced by light tapping as opposed to heavy thumping" (Zagorski-Thomas, 2012, p.8). Therefore, the low frequency content of CMM productions will be inherently associated with large, intense and powerful entities, and it is these qualities that are being referred to when the term 'sonic weight' is employed.

Despite the correlation between low frequencies and sonic weight, to restrict the focus of CMM's 'heaviness' to the low frequency ranges alone would be a mistake. Despite the associations of size, power and intensity that these low frequencies portray, CMM derives much of its sonic impact from providing the listener with the sense of utmost proximity to the band and by providing intelligibility to the sounds

involved. One of the principal ways that a band's apparent proximity to the listener is achieved is through the capture and amplification of high frequency content.

### **3.5 High Frequencies, Proximity and Intelligibility**

Due to high frequency sound dissipating with distance, the perception of heightened high frequency content is associated with sound being very close and intimate. Zagorski-Thomas even suggests that intense high frequency content "can be used to make something seem closer than the loudspeaker it emanates from" (Zagorski-Thomas, 2012, p.8). Additionally, the perception of sound being very close and intimate is an essential element of CMM's intelligibility. However, similar to 'heaviness' not being restricted to low frequencies, it is important to note that the concept of intelligibility is not solely restricted to high frequency content. For example, appropriate control of low frequency content is also essential to intelligibility.

At this point, it is relevant to note that; "Distortion also results in a timbral change towards brightness...since distorting a signal increases the energy of its higher harmonics" (Walser, 1993, p.42). Furthermore, when additional spectral information, in the form of high frequency energy, is introduced to guitars' timbres, they are perceived as heavier (Berger and Fales, 2005, pp.193-194). In order for the other instrumentation to punch through, and be perceived as within the same context of, this 'sonic wall' (Turner, 2009) of extremely bright rhythm guitars, heightened high frequency content is normally required for much of the other instrumentation.

Furthermore, capturing or enhancing high, as well as low, frequencies in this manner will often result in sounds being perceived as louder than they actually are. The reason for this is that human hearing is exponentially more sensitive to low and high frequencies the louder they are in volume (Senior, 2011, p.62). These frequencies at the extremes of the audio spectrum significantly contribute to our somatic perception of sound, due to their ability to cause vibrations in skin and internal organs (Zagorski-Thomas, 2014b, p.7).

Attenuating the low mids is a technique that, psycho-acoustically, can achieve the same result as simultaneously emphasising low and high frequencies. It can be noted that the attenuation of low-mid frequencies is not only a stylistic marker of the death metal sub-genre's guitar tones (referred to as 'scooped') but also a staple

production technique for the CMM style in general. In many ways, the important element of the sense of space used in CMM production is the bearing that ‘holes’ have within the four dimensions of laterality, prominence, register and temporal continuity (Moore, 2001, p.121). For CMM, these ‘holes’ will often be created in the low-mid frequency range.

In terms of the performance space within which CMM resides, we have established that, although the sounds involved will be perceived as being powerful and of great size, they will also be received as being very close and intimate to the listener. This considerable emphasis of frequency content towards the lower and upper ranges of human hearing means that CMM’s sounds are perceived as occupying considerable height on the vertical plane. “This provides a visual illustration of a metaphorical relationship: that a fuller range of frequencies creates a sensation of fuller musical space” (Zagorski-Thomas, 2014a, p.13). Although space, in the form of low-mid attenuation, is often sculpted into this vertical plane, this tends to further emphasise the perceived elevation of this dimension.

An additional consideration relating to our perception of proximity is very simply volume, which Moore refers to as “a factor of both relative dynamic level and degree of distortion” (Moore, 2012, p.31). The louder a sound is, the closer it is perceived to be to the listener, and conversely the quieter, or softer, a sound is, the further away it is perceived. The previous section discussed the associations between distortion, as well as compression, and volume. Suffice to say that the majority of sounds involved in CMM are perceived as particularly loud, and therefore highly proximate to the listener. From a temporal continuity perspective, the impact of radical distortion and aggressive compression provides a minimal dynamic range to CMM production and therefore also provides high consistency of perceived volume.

Discussion of the perception of proximity from frequency and volume perspectives, and the size of the sounds involved has been presented. That brings us to considering the perception of the space and environment in which CMM performance resides.

### **3.6 The Perceived Size of the Performance Environment**

Moylan identifies the performance environment as the perceived overall space in which a 'performance' takes place (Moylan, 2007, p.52). The perceived performance environment of CMM productions derives much of its sonic impact from the listener having the sense of utmost proximity to the band and the relevant sounds involved. Other than high frequency content and volume considerations, a further factor that has considerable bearing on intimacy and closeness is ambience. The term ambience will be used to refer to both the character of the recording environment, as well as the use of reverb during the mixing process.

Illustrating the link between depth and perceived distance, Moore refers to musical depth as providing the "illusory sense that some sounds originate at a greater distance than others" (Moore, 2001, p.121). This is because ambience puts up "a subtle barrier between the listener and the hitherto immediacy of the sound" (Moore, 2001, p.123). With this increase in distance though, sounds are perceived as softer and less intense (Gibson, 2005, p.23). A decrease in intensity, with softer sounds due to a barrier dampening the immediacy of the sound, directly opposes the requirements for CMM's heaviness requirements. Perceived acoustical depth and space of the performance environment is, therefore, directly contrary to the requirement of perceived proximity. When Moore states, "Most rock also attempts a sense of musical 'depth'...giving a sense of textural foreground, middleground and background" (Moore, 2001, p.121), this does not apply to CMM, where the principal focus is foregrounded sounds.

However, the requirement for minimal ambience in CMM is not purely ascribable to heaviness' aesthetic requirement of proximity. It is also due to CMM's predominant performance characteristics. These are discussed at length in Appendices 7 and 8. However, three salient points are the inclinations of CMM performance toward: high tempi; fast subdivisions and sub-divisional complexity of the drums, bass and rhythm guitars; and a focus on synchronisation between the drums, guitar and bass resulting in a significant concentration of musical sounds within the space that the music resides. Very simply, these performance characteristics tend to leave very little space for reverberant characteristics. Due to the small inter-onset intervals involved; even the shortest reverb times would likely 'soften' the subsequent transients of the instrumentation involved, and similarly diminish the impact of the ensemble staccato components that are a regular feature of CMM. In this respect, Zagorski-Thomas

associates 'dry' drum or percussion sounds, with having their onset accentuated or highlighted (Zagorski-Thomas, 2010, p.253). Therefore, the minimisation of the physico-spatial conditions of the recording environment, combined with highly limited use of reverb, can be equated with the retention and augmentation of the attack and articulation characteristics of the performance. For these reasons, the author proposes that when Phil Tagg suggests, "this aspect of urban soundscape is intoned in heavy metal accompaniment...by adding considerable amounts of reverb to a recording or performance" (Tagg, 1992, p.47), this does not apply to CMM production. When specialist CMM producer Colin Richardson was asked about his use of room/ambient microphones, he replied, "We don't use them. The further away you go, the less in your face it sounds. I've tried room mics, but I just get into awful trouble with them" (Richardson, 2011).

Excluding the acoustic environment creates a tight and present impact (Huber and Runstein, 2005, p.138). This is achieved by placing the microphone close to the source, which will therefore be louder in relation to the ambient sound, than if it was placed at a greater distance. Zagorski-Thomas refers to:

Multiple microphones and close placement was being used to create cartoon representations of clarity: for example, where the listener is impossibly close to all the instruments in an ensemble simultaneously.  
(Zagorski-Thomas, 2014b, p.9)

Although close miking, sometimes referred to as spot miking, is standard in most forms of popular music recording, this is usually combined with the use of ambient microphones. However, for the recording of CMM, there is a tendency toward the exclusive use of close microphone placement, due to the exaggerated sense of aural intimacy that this provides (Zagorski- Thomas, 2008, p.204).

Although the influence of classical music on metal and the appropriations of its virtuosity are widely acknowledged (e.g. Walser, 1992), this simultaneous sonic close-up of the sounds involved in CMM can be considered as the converse of classical recording techniques. One of the principal classical recording techniques is to capture and reproduce the sound of the concert hall and its colouration of the collective sound, referred to by Doyle as a 'romanticist' recording aesthetic (Doyle, 2006). In contrast, CMM productions largely tend to remove any clues as to the recording space where the performances occurred, referred to by Doyle (2006) as a 'realist' recording aesthetic, then add small amounts of synthetic reverb, where

required. As already highlighted, the limited sonic space available in CMM, and the manner in which reverb would 'soften' subsequent transients of the fast inter-onset intervals, means that minimal levels of reverb with very short time characteristics are generally applied to the mix. These level and time characteristics are usually linked to the inter-onset intervals of the performance. Smaller inter-onset intervals will normally correlate with even more restricted reverb levels and time characteristics. Furthermore, this will be on a limited range of sources, likely to solely be the snare and toms, as well as vocals (to which restricted levels of delay would also probably be applied). Therefore, CMM's sounds are generally not 'staged' as being within an enclosed architectural environment, and hence, are unlikely to be perceived as emanating from a natural performance space. For this reason, there is effectively no 'back' to CMM's sound sources, the existence of which would provide 'depth' (Moore, 2012, p.37). Therefore, despite CMM's sounds being inherently associated with large, intense and powerful entities, which are very close to the listener, and occupy considerable height on the vertical plane, these sounds are not usually provided with any significant perspective of depth.

Simon Zagorski-Thomas (2010) in his publication 'The stadium in your bedroom: functional staging, authenticity and the audience-led aesthetic in record production' discusses the concept of functional staging:

The staging of sounds in the record production process is considered to be functional if the reason for their particular placement or treatment is related to the practicalities of audience reception rather than to aesthetics  
(Zagorski-Thomas, 2010, p.1)

A strong differentiation between the staging of dance music and rock music is provided. He makes the distinction between music that is, in the case of the former, principally played in a club setting, and the latter, that is primarily listened to in much smaller environments, such as in the home. Due to the large speakers, and more ambient club environment, he highlights that the rhythmic elements of dance music is mixed with minimal, or no, reverb in order to maintain the clarity of the rhythmic components. In contrast, rock music is argued to involve the addition of long reverbs and echo in order to provide the home listening environment with "some aspects of the acoustic characteristics of the arena/stadium experience in order to create the sensation of scale" (Zagorski-Thomas, 2010, p.256). For these reasons, a relationship between the mix and its assumed use within particular environments is proposed.



It would appear that functional staging has relevance to CMM, due to the shared ambient characteristics and requirement of the bass drum's prominence (Turner, 2012, pp.38-39) in both CMM and dance music. However, the reason for CMM's 'dry' spatial signature is not linked in any way to its assumed reception environment, be it headphones, home or club. It is simply that the impact of anything other than cursory levels of ambience, contradicts the core textural aesthetics of the music and its performative characteristics. Hence, in direct contrast to Zagorski-Thomas' functional staging concept, CMM productions' particular placement and treatment of the depth perspective is related to enhancing the bodily pleasures of sound rather than the practicalities of audience reception.

The author therefore proposes that, rather than functional staging, the term 'organic staging' would be more appropriate to describe CMM's performance space. In this respect, the term 'organic' is characterised, "by a harmonious relationship between the elements of a whole" (Oxford Dictionary of English, 2013). Minimisation of the depth perspective facilitates a harmonious relationship between CMM's textural and performative attributes, and the heaviness and intelligibility of these qualities when presented in recorded and mixed form.

It is an ambitious undertaking to determine how various listeners, with differing systems and environments, may perceive and interpret the performance environment of CMM from a spatial perspective. However, it is unlikely that a clear and coherent physical performance space and environment is imagined or envisioned by the listener. Despite the perceived size of the highly proximate sounds involved, these are not staged within a confined architectural environment. Although the sounds of CMM suggest physical performance movements, the physico-spatial conditions of the recording environment, and psycho-acoustic clues as to what kind of real-world space, or place, this is, are largely removed. Effectively therefore, this is a performance space that cannot be considered as being a 'real' ensemble performance space. Hence, this renders CMM's virtual performance space as synthetically-spatialised.

Despite this fabricated soundscape that cannot be imagined, this is not one that could be referred to as abstract. The sonic impact of a high commercial standard CMM production provides its own highly effective reality, whereby the highly controlled ambient characteristics combined with sounds that are very close, but of

great apparent size, are compressed into a single blended space. This is not hard for the listener to make sense of, as the sounds are not manipulated in any extraordinary way, and mostly, are all perceived as coming from the same location. However the manner in which these sounds are presented can only exist in the production's artificial environment. This dichotomy is referred to as 'unreal-realism' (Moore, 2012, 257). In referring to novel 'imaginary' representations of performance, such as those in CMM, Zagorski-Thomas argues,

The point about these representations is that they draw on our previous experience and knowledge of spatial sound but do so schematically; by representing some of the auditory characteristics of space but not others or by creating something that is reminiscent of these characteristics (Zagorski-Thomas, 2014b, p.8)

It is important to note that these production characteristics are often presented in other music styles, such as hip-hop, dance, even popular music in general, and in fact are nothing new. For example, when Alan Moore suggests "there is a sense of great density, the sound is very full – but there is correspondingly little sense of depth" (Moore, 2012, p.38) this could easily be in reference to CMM production. However, this quote actually refers to the Beatles' 1963 recording 'She Loves You'.

### **3.7 Stereo Placement and Dynamic Staging**

The placement of CMM's sounds across the stereo image does not emphasise realism. Also, with very few notable exceptions, it is rare that there is any significant movement across the stereo image from a temporal continuity perspective. Similarly, with the notable exception of specific quieter sections, often featuring clean guitar sounds, or during ensemble staccato components, there is minimal dynamic staging. CMM productions therefore tend to present a static stereo image. This stereo image is usually weighted heavily towards the extremities of both directions of the stereo image by virtue of the rhythm guitars, which are panned very wide. The drums, also, are usually provided with a similarly wide stereo image, but not quite as wide as the guitars. This artificial width to the stereo image has a tendency to contribute to the perceived separation, and therefore intelligibility, of the various instruments, as well as size of the production. From most other perspectives though, the conventions of CMM's stereo placement cannot be differentiated from other forms of rock music with similar instrumentation.

Discussion of the perceptions of CMM's sound sources and performances, as they exist within the four dimensions of the sound box has been presented. That brings us to considering the level and type of energy being expended in CMM performance, and how this energy is represented in recorded and mixed form.

### **3.8 The Level and Type of Energy being Expended**

Although there are numerous exceptions to the general trend, for instance the industrial-metal sub genre, the majority of CMM's sounds index sound producers in the form of performing musicians, rather than computer, or synthetic based sound production. Additionally, despite the tendency for high levels of technological mediation in CMM's recorded and mixed form, producers in the field invariably focus the results of this technological mediation toward the performative nuances, or idealised performative nuances, of performing musicians. An example of which would be the producer's focus on retaining the snare dynamics of the drummer's performance when using drum samples to reinforce, or replace. Therefore, in discussing the type and level of energy being expended in CMM, it is firstly important to consider the sounds, and the way these sounds are performed and therefore created.

CMM performance perspectives and practices are discussed at length in Appendix 3. However, once again, it is relevant to mention the same three salient points as presented earlier. Namely, the inclinations of CMM performance toward: high tempi; fast subdivisions; and a focus on synchronisation between the drums, guitar and bass. In simple terms, CMM's high tempi and fast subdivisions involve the drums, bass and guitars making the same sound, more than once, very fast. Regardless of whether this is, for instance, fast double bass drums, snare blast beats, fast down picking or tremolo picking, these will create a high level of transients. In CMM, this high level of transient detail is usually correlate with a high level of energy being expended. This is particularly so when the fast subdivisions of the drums, bass and guitar are largely, or entirely, synchronised, often emphasised even further by ensemble staccato components. As will be discussed, many of the production techniques aim to accentuate this transient detail and therefore accentuate the energy of the performative gestures. Importantly, this enhances and exaggerates the feelings of performance physicality that is required to produce these highly embodied sounds. This is carried out with the principal aim of evoking a synaesthetic response in the listener. In this respect, Wallach refers to the impact of music's sound often

being 'audiotactile', in that it aims to literally move the listener (Wallach, 2003, p.42). He goes on to state that, "Music recordings are cultural objects whose meaningful effects come about primarily through their ability to produce material sonic presences" (Wallach, 2003, p.37). In recorded music, Corbett discusses embodied presence as tracing visual presence (Corbett, 1994, p. 41-44). This would appear to be particularly true of CMM where particular cultural understandings, often gained through the live experience, become embedded in the experience. An example of such cultural understanding would be the actions that are performed to create certain sounds. Frith states, "Most listeners, for example, no longer care that they have no idea what instrument (if any) makes their favorite sound" (Frith, 1988, p.125). However, this is likely to be far from the case for CMM listeners. In many instances when guitars are perceived, the actions and emotional associations behind the relevant sounds are simulated. Wallach refers to sound waves' ability to create this experience as 'copresence' (Wallach, 2003, p.36). In CMM this notion of copresence is largely achieved through the intelligibility of the various sound sources, the emotional associations of which, therefore, contribute to a production's perceived heaviness. The author therefore proposes that productions presenting a lo-fi approach, with reduced sound source intelligibility, are not as subjectively heavy as those where the performative gestures of the musicians are more intelligible. An example of this would be contrasting the 'lo-fi' approach of Darkthrone's (1994) "Transilvanian Hunger", where the transients of the drum performance are largely unintelligible, with the high-fidelity/high commercial standards of Dimmu Borgir's (1999) "Spiritual Black Dimensions". Having considered the level of energy expended, our attention will now turn to the type of energy expended.

In order for the same sound to be played repeatedly at a very fast speed, this cannot be achieved without highly controlled exertion of energy, in the form of limb movements. For example, for fast bass drums, fast snare drums and fast down picking, the same principal is relevant. In order for a sound to be made again, a foot, or wrist needs to be moved in an upward motion to enable the sound to be made again with the downward motion. The distance of the upward motion needs to be precisely controlled in order to facilitate the continued repetition of this single sound. The same is true of tremolo picking, whereby single pitches are repeated in very quick succession at a fixed pulse, and played smoothly without any breaks between the notes. This is performed on single strings, and therefore can only be efficiently carried out with controlled picking motions which, similarly, facilitates the requisite fast downward, followed by upward, picking motions. In both examples, the distance

of the relevant limb's excursion is highly limited by the simple fact that a further motion in the opposite direction needs to be carried out. Again, precise control of the energy being expended is required to carry this out effectively.

The level of energy being expended in CMM is therefore high, whereas the type of energy being expended is highly controlled. Maintaining these high, and controlled, energy levels throughout a production is one of the principal aims of a high commercial standard of CMM production. As these persistent levels index embodied movements in real space, the perceived performances will suggest a high level of performance energy. In turn, this reflects the nature, or idealised nature, of the performative gestures themselves.

## **Production Strategies for Presenting the Key Concepts of the Secondary Domain**

## **4. Production Strategies for Presenting the Key Concepts of the Second Domain**

Distortion provides the principle characteristic associated with heaviness and how to most effectively implement distortion is a primary challenge for achieving high commercial standards of CMM production. It is important that sufficient gain is used for the rhythm guitars in order to enable density of timbre and a high perception of proximity, as well as enhanced harmonic content and signal compression. However, too much distortion will inappropriately neutralise the guitar's dynamic content, thereby obscuring the note onset and therefore the guitar's definition and intelligibility. This challenge will be highly impacted by the level of down tuning, and should be engaged with, and controlled, throughout the recording stage of quad tracked guitars. The use of distortion additionally has relevance to bass guitar sounds, as well as vocal sounds, where its use can provide enhanced perception of proximity and harmonic content, as well as a timbre that is more appropriate to the context provided by the rhythm guitars.

Providing sonic weight, which refers to sounds that are associated with large, intense and powerful entities, is an essential element of CMM's impact. However, this sonic weight needs to be highly controlled, so that the energy and clarity associated with the high frequency content is not obscured. The faster and denser the performances and timbres involved, the more controlled and 'rolled-off' the low frequency content will likely need to be, to prevent the sonic weight detracting from the high frequency content.

Capturing and accentuating the energy related to the musicians' performance physicality is important for a high commercial standard of CMM production. This can partly be achieved by providing intelligibility to these performative gestures through the relevant sounds being perceived as very close and intimate. Heightened high frequency content can provide the perception of closeness and intimacy, and is also correlated with an increase in heaviness. It is relevant to note that distortion increases the energy of higher frequency harmonics, and also that attenuation of low-mids can accentuate the perception of high, as well as low, frequencies.

CMM production derives much of its sonic impact from the listener having the sense of utmost proximity to the band and the relevant sounds involved. Due to ambience providing a barrier to this proximity, CMM has a particularly 'dry' spatial signature. This can be achieved by taking steps to exclude the acoustic environment at the recording stage, as well as the use of minimal levels of reverberation, with very short time characteristics, on a limited range of sources at the mix stage.

In general, there is minimal dynamic staging in CMM productions and a static stereo image. This stereo image presents rhythm guitars that are panned very wide, as well as drums that are similarly wide, but to a lesser extent than the guitars. CMM's high level of transient detail is usually a correlate for a high level of energy being expended. To enable this high level of transient detail in the performances, highly controlled exertion of energy is required. It is important to accentuate this transient detail and therefore accentuate the energy of the performative gestures, and similarly important that this energy is presented in a controlled manner.



# **High Commercial Standard of Contemporary Metal Music Production**

## **5. High Commercial Standard of Contemporary Metal Music Production**

Frith suggests that academics have a duty to make value judgments, rather than evade them (Frith, 1996, p.8). He proposes that,

Popular cultural arguments...are not about likes and dislikes as such, but about ways of listening, ways of hearing, about ways of being. The importance of value judgment for popular culture thus seems obvious, but it has been quite neglected.  
(Frith, 1996, p.8)

These sentiments are relevant to the provision of a conceptual framework of a 'high commercial standard' of CMM production. In other words, the concept of a high commercial standard is intrinsically linked to ways of listening, hearing and being, which therefore require value judgments to be made. Here, these value judgments will likely involve shifting and conflicting opinions about the relationship between CMM and sound quality. Due to these value judgments not being able to offer a fixed standard, they could be viewed as problematic. However, a conceptual framework, with subjective boundaries that are informed by a central criterion, will nevertheless be provided.

Numerous writers have highlighted the dichotomy in popular music between artistic/authentic/aesthetic values versus commercial concerns. For example, Moore refers to "the opposition between the authentic and the commercial" (Moore, 2002, p.211), and Frith discusses the rhetoric between art and commercial values being kept apart (Frith, 1996, p.42). However, as will be explained, in CMM, when represented in recorded and mixed form, this dualism is largely removed.

The technicality of musical composition and performance complexity often displayed in CMM represents a fundamental authentic/artistic perspective. This proficiency and sophistication is often afforded high value and esteem by artists and enthusiasts alike (Purcell, 2003, pp.12-14), with Phillipov claiming,

Technical complexity is often claimed as a virtue in and of itself, with fans and musicians often claiming a level of prestige for the music based on its technical difficulty.  
(Phillipov, 2012, p.64)

Clearly, contemporary metal culture places high value on genuine virtuosity and

musicianship. However, for the listener to be convinced of virtuosity and advanced standards of musicianship in a CMM production, a high level of clarity needs to be provided. If this clarity is not provided, the often-complex performative gestures are rendered largely unintelligible, and the ability to receive, or perceive, the virtuosity involved becomes obscured, or lost. An example here is the previously mentioned Darkthrone (1994) album “Transilvanian Hunger”, where despite fast double bass drum work being performed on many of the album’s tracks, this is largely unintelligible. Therefore, from a fan and musician perspective, the high value, esteem and prestige of the music is similarly obscured or lost. Hence, for CMM production, intelligibility is an essential aesthetic principle for conveying artistry and authenticity.

Izhaki states “Intelligibility is the most elementary requirement of sonic quality” and “sonic quality is also a powerful selling point” (Izhaki, 2007, p.5). As we can see then, effectively conveying CMM’s artistry and authenticity through intelligibility of performance is therefore inherently linked to what can be considered a high commercial standard. Although it is relevant to note here that the black metal sub-genre is renowned for its lo-fi production aesthetics, it is also relevant to note that the most commercially successful black metal bands, for example Cradle of Filth and Dimmu Borgir, tend toward high levels of intelligibility and high commercial standards of production.

These criteria of clarity and intelligibility have become essential to CMM. They have largely shaped the expectations of bands, musicians, record labels and enthusiasts and have become central aesthetic values pursued by CMM producers. However, clearly, it would be problematic to attempt to propose a ‘fixed standard’ of what CMM audiences want from a production perspective.

The way that intelligibility is captured, enhanced and presented is an important element that needs to be negotiated between the band and producer. For example, artists that have a tendency more toward sound/timbre than performance/note complexity would likely require less accentuation of intelligibility. Therefore, heavily emphasised attack transients could sound highly inappropriate for this focus on sound/timbre, which potentially might require greater emphasis on sonic weight.

Additionally, as many of the publications for this thesis highlight, intelligibility in CMM production is often highly technologically mediated. Therefore, despite authenticity often being provided via the clarity of virtuosic performances, the

technological mediation normally required for this clarity could itself be considered as inauthentic. Additionally, as will be discussed in the next section on the primary domain of CMM, performance precision, also, is often technologically mediated. As performance precision is correlated to high commercial standards, this element of the production could similarly be considered as inauthentic. The conceptual framework of a high commercial standard of CMM production can therefore be viewed as fluid.

This discussion has highlighted that CMM's artistic and commercial values are often aligned. The representation of both is primarily through intelligibility, and this is a principle requirement for high commercial standards of production for CMM. We will now turn to considerations of high commercial standards within CMM's primary as well secondary domains. In the secondary domain we will see that the music's essential and defining characteristic of heaviness is contributed to by intelligibility.

### **5.1 High Commercial Standards - The Primary Domain**

In the primary domain, CMM's performance perspectives, and practices, are more concerned with tempo and rhythm than melody and harmony. As fully discussed in both item one and Appendix 3, at its most fundamental level, the identity of CMM denotes a tendency to focus on the intensity and intricacy of rhythmically concentrated drum, bass, and guitar patterns. These patterns are frequently performed at high tempi, and often feature high levels of synchronisation. To maximise the potential for accurate ensemble synchronisation straight, metronomic performances, with minimal, or no, expressive timing variations in the performance, are frequently required. As CMM performances are predominantly based around fast and/or complex subdivisions, with high levels of accentuation or synchronisation, the concept of rhythmical perfection is a characteristic that many musicians and producers endeavour to capture and present.

Therefore, in relation to the primary domain, a high commercial standard of CMM production will usually present elevated levels of performance precision.

## **5.2 High Commercial Standards - The Secondary Domain**

In the secondary domain, high commercial standards of CMM production are distinguished by a combination of heaviness and intelligibility.

CMM's heaviness is intrinsically related to distorted rhythm guitars, but also to sounds perceived as emanating from large, intense and powerful entities, referred to as sonic weight. In addition to its fundamental link with heaviness, distortion also enhances brightness, which additionally adds to perceptions of heaviness. Similarly, the perception of heightened high frequency content is associated with sound sources being very close and intimate, which is an essential element of CMM's intelligibility and this intelligibility is important to CMM. It facilitates the listener's clear comprehension of the frequent overarching complexity in the music's construction. However, intelligibility is not only important in its own right; it also contributes to the perception of CMM's heaviness. Intelligibility enhances the representation of embodied movements in space, suggesting a high level of performance energy. This sense of energy contributes to CMM's heaviness and helps evoke a synaesthetic response in the listener.

## **The Publications**

## 6. The Publications

### Conference Proceedings

**Item 1.** Mynett, M. (2009) The use of click tracks for drum production within the Extreme Metal genre. *Proceedings of the 2009 Art of Record Production*, 13-15 November 2009, London: Association for the Study of the Art of Record Production.

This publication is concerned with tempo, metre and rhythm, which are qualities related to the primary domain (Moore, 2012, p.29). The paper explores the use of click tracks and the benefits of their use in achieving precision of drum performance. The use of a click track provides an essential central reference point for both the performer and producer. Furthermore, it facilitates a variety of recording, editing, quantisation and kick-pattern building methods to be employed. These can create the illusion of drum performance precision and accuracy. The knowledge and experience that is essential for mastering these techniques can be viewed as a specific skill that those producers working within CMM music need to develop. This work represents the author's earliest academic writing, reflecting a highly practitioner-based perspective.

The specific attributes of CMM performance and production, which are the focus of the technological mediation presented in this publication - fast, and complex, subdivisions, rhythmic complexity, ensemble synchronisation, overall focus of performance precision etc. - do not tend to feature in other forms of music. The techniques and approaches analysed here are therefore most relevant to procedural methodologies for the production of CMM. From an academic perspective these methodologies are, at present, "virtually non-existent" (Turner, 2012, p.ii). Therefore the technological mediation techniques and approaches discussed in this paper are an original contribution within the fields of both the academic study of record production, as well as that more specifically focused on CMM.

### Conference Proceedings in Journals

**Item 2.** M. Mynett (2011), Sound at Source: The creative practice of re-heading, dampening and drum tuning for the contemporary metal genre. *Journal on the Art of Record Production*, London: Association for the Study of the Art of Record

Production. (5).

This publication is concerned with the secondary domain characteristics of sonic weight, high frequency content and intelligibility. It focuses on achieving appropriate depth, sonic weight, and transient attack to drum shell sounds, at source, for CMM. The paper commences with an exploration of the physical properties of drums and their impact on drum sounds. For example, it highlights that the denser, brighter, controlled and focused timbre of birch shells are appropriate to drum performances with fast subdivisions. However, the vast majority of drums' sound comes from the drumheads. Therefore, the main discussion relates to drum tuning, in combination with re-heading and dampening. The manner in which the two heads of a drum are tuned, and therefore interact, has a significant impact on the drum's weight, attack and sustain. Broad principles that can be applied to gain the most appropriate timbres at source for CMM drums sound are presented.

In comparison to the substantial volume of academic publications concentrating on the engineering and art of recording, minimal focus has been directed toward the subject of sound at source. It perhaps appears that more attention is provided to 'how' something is recorded than the inherent qualities of the actual audio source itself being recorded. The relevance here is that the sound at source will inevitably have far higher impact on the resulting recording than, for example, the microphone that was used within the process. This publication therefore provides an original contribution to an underdeveloped subject area within the academic study of record production. In many areas it will have high relevance to achieving the right sound at source for the particularly challenging area of drum tuning for many other styles of music. However, specific discourse, and conclusions, for the creative practice of drum tuning for CMM provides an original contribution in a generally understudied subject area.

**Item 3.** M. Mynett (2012) Achieving Intelligibility Whilst Maintaining Heaviness When Producing Contemporary Metal Music. *Journal on the Art of Record Production*, London: Association for the Study of the Art of Record Production. (6).

This publication is concerned with the secondary domain characteristics of distortion, sonic weight, high frequency content, proximity, energy expenditure, and intelligibility. Heaviness and intelligibility are the principal objectives of a high



commercial standard of contemporary metal music production, and are the focus of this paper.

CMM's performative techniques, and timbres, provide a sense of intensity, density, and heaviness. However these qualities present numerous challenges to retaining definition and intelligibility, which is fundamental to presenting a high level of sonic clarity for these often-complex performances. This paper provides an original contribution to CMM production's academic body of knowledge by contextualising the specific challenges that need to be balanced for the effective representation of heaviness and intelligibility. These include: performance attributes; impact of down tuning and density of sounds; frequency content; perceived volume levels; spatial and depth characteristics; transient design; as well as frequency content, compression and separation techniques.

## Articles

**Item 4.** Mynett (2009) The Sound on Sound Guide to Recording and Producing Modern Metal. *Sound on Sound*. (25) 1, pp.120-133.

**Item 5.** Mynett (2009) Mixing Metal - The Sound on Sound Guide to Extreme Metal Production. *Sound on Sound*. (26) 2, pp.118-126.

This publication is concerned with primary domains, as well as the secondary domain characteristics of distortion, sonic weight, high frequency content, proximity, energy expenditure, and intelligibility. Collectively, these two *Sound on Sound* articles provide a comprehensive production methodology for CMM. The approaches, techniques and processes are presented from the three stages of pre-production, engineering/recording, and mixing.

An original contribution to knowledge is firstly provided through the discussion of pre-production principles in item 4. Designing a project's blueprint during the pre-production stage is a much under-valued area, and particularly so for CMM, where the use of tempo mapping and click tracks is likely to be very high on the producer's priority list. Similarly, an original contribution to the body of knowledge available for the recording and engineering stage of CMM is provided. Here specific areas, such as double-microphone and individual cymbal microphone techniques, bleed

minimisation, use of drum triggers, creation of drum samples, bass distortion are provided. Most of these are subjects that have received minimal attention in either academic or journalistic publications. Likewise, mix techniques and processes that are particular to CMM mixing are also presented. Original contributions include the implementation and use of drum samples, with discussion of sample selection, and the importance of time alignment, as well as intelligent equalisation, compression, and effects principles.

**Item 6.** Mynett (2010) Get the Perfect Bass. *Computer Music*. (12) pp.63-70

This publication is concerned with the secondary domain characteristics of sonic weight, high frequency content, proximity and intelligibility. The production methods presented in this paper relate to CMM's requirement of heaviness and sonic weight combined with definition and intelligibility within the context of often-complex and virtuosic musical performance techniques. Although this article does not specifically refer to CMM, many of the techniques and approaches are pertinent not only to achieving the right bass sound for CMM, but also to fully exploiting the relationship between the bass sound and the bass drum. These are critical factors in providing a production with the essential qualities of heaviness and intelligibility.

Focusing upon the often-overlooked perspective of bass tones, this publication makes an original contribution to knowledge by engaging with analysis of how to most effectively exploit the relationship between the drums and bass, and carefully sculpting the place where the bass sits within the whole mix. Creating density of bass sound through layers is highly relevant to CMM production, as is the use of a distorted layer. Techniques for heavy dynamic range limitation is provided through discussion of series and multiband compression, and the space and place of the bass in relation to the kick drum is specifically approached through discussion of intelligent equalisation techniques.

**Item 7.** Mynett (written under the pseudonym Tenym, J. 2010) The Sound and the Fury – The Ultimate Guide to Recording Hard Rock and Extreme Metal. Part 1. *Guitar World*. (4) pp.70-78

**Item 8.** Mynett (written under the pseudonym Tenym, J. 2010) The Sound and the Fury. Part 2. *Guitar World*. (5) pp.72-86

This publication is concerned with primary domains, as well as the secondary domain characteristics of distortion, sonic weight, high frequency content, proximity, energy expenditure, and intelligibility. These two *Guitar World* articles were written under the pseudonym of the author's middle name, and then surname reversed. They provide wide-ranging production methods aimed at enabling novice producers with restricted budgets to work towards higher production values. These are focused on commonly shared performance perspectives, sounds and timbres in CMM.

It is unfortunate that the editing of these articles following submission resulted in a number of vague, inaccurate or incorrect statements. The changes and edits made were not presented to the author for comment. Examples of vague statements include the section on 'Budgets and the Importance of Drum Tracking' listing four toms and three rack toms being potentially included in a drummer's set-up. This incorrectly seems to suggest that drummers from the style might opt to use four floor toms. The kick drum resonator head is stated as giving the drum attack, when this should be batter head. The drum samples section states "Unless a performance requires a complete fix, most producers for the genre, myself included, prefer to use drum samples to reinforce, rather than as replacements for..." It would be more accurate to state that "Unless the drum timbres of a recorded performance require a complete fix..." Furthermore, gating is referred to as being used to block out the unwanted sounds of fingers on guitar strings, when this would usually be carried out with waveform edits. Additionally, the author did not make any mention of a 'resonance setting' when referring to equalisation in the 'EQ' section. Finally, series compression in the form of a compressor on the channel, and a compressor on the group, is incorrectly referred to as parallel compression in the following section.

These articles provide an original contribution to knowledge by retaining a focus on high commercial standards of production but enabling this to be achieved by novice producers with restricted budgets.

## **Book Chapter**

**Item 9.** M. Mynett (2011), *Intelligent Equalisation Principles and Techniques for Minimising Masking when Mixing the Extreme Modern Metal Genre*. Heavy Fundametalisms: Music, Metal and Politics, Oxford: Inter-Disciplinary Press, pp.141-146.

This publication is concerned with the secondary domain characteristics of sonic weight, high frequency content, proximity and intelligibility. As discussed, CMM regularly features fast subdivisions and down tuned, heavily distorted, and harmonically dense rhythm guitars. Furthermore, there is a focus on synchronisation of the drums, bass and rhythm guitar, often resulting in, and what is highlighted as, ensemble rhythmic complexity. These qualities tend to result in a dense mix with pronounced low frequencies. However, these characteristics result in CMM being especially prone to the phenomenon of masking. Masking in plain terms is the capability of frequencies of a certain sound to inhibit or obscure, in other words mask, the frequencies of another sound. Avoiding masking is a fundamental aspect of perceived loudness, clarity, definition and intelligibility, which are defining features of professional standard CMM production.

Although there are very few publications focused purely on mixing, frequency masking is a concept that is commonly understood from the perspective of numerous styles of music. However this publication presents an original contribution to knowledge by specifically focusing on the minimisation of frequency masking when mixing CMM.

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The production methods presented in these nine publications detail the core approaches to capturing and providing heaviness and sonic weight, definition and intelligibility, and approaches to enabling, or creating, performance precision. These are the essential characteristics and defining features of CMM production. Additionally, many of these approaches, processes, and techniques, detail specific responses to the challenges presented by CMM's commonly shared performance perspectives, sounds, timbres, and practices.

These represent the vast range of skills and attributes required of CMM producers. Further discussion highlighting the role of music producers, and more specifically, the role of CMM producers will now be provided.

## **Contemporary Metal Music Producers**

## 7. Contemporary Metal Music Producers

Music production is one of the primary mediums for entertainment for consumers worldwide, ringing up nearly \$30 billion in retail sales in 2007, according to global music body IFPI.

(Baskerville and Baskerville, 2010, p.4)

However, to provide a concise definition, relevant to the 21<sup>st</sup> Century, of what 'music production' is can be seen as challenging. In recent years the meaning of the term has evolved considerably from the commonly held connotations from 15 to 20 years ago, often referring to a far wider range of skills and roles (Hepworth-Sawyer and Golding, 2011, p.3). The central reasons and most observable factors for these transformations in music production are the developments in recording and production technology, and its democratisation, mainly due to affordability (Zagorski-Thomas, 2008, p.4).

Essentially though, music production can be looked at as a term that refers to the creative and artistic development of music to a level at which it can be artistically, or commercially, realised, in a format that can communicate to others.

Similarly, providing a concise definition, relevant to the 21<sup>st</sup> Century, of what a music producer does, also presents numerous challenges (Dochtermann, 2011, p.177) as this involves identifying the vast range of skills and attributes involved (Hepworth-Sawyer and Golding, 2011, p.6). Additionally, the methods and manner in which a producer operates will often differ greatly between individuals, as well as from project to project.

However, Hepworth-Sawyer and Golding state that producers provide guidance to the process and people involved, as well as nurturing and enhancing the talent and the music (Hepworth-Sawyer and Golding, 2011, p.5). The traditional role of producer therefore tends to refer to someone provided with a high degree of creative control of the recording and mixing process. However, to view the producer role as purely a creative force would be incorrect (Hepworth-Sawyer and Golding, 2011, p.5). Historically, the position also consisted of booking not only the studio but also the musicians, as well as directing the schedule and being in overall control of the album budget and financial side of the production. Therefore, Howlett considers 'project manager' to most accurately embody the universally accepted role of a producer (Howlett, 2009, p.15). Additionally, he proposes a concept of the record producer as

'nexus'. "The nexus is between the creative inspiration of the artist, the technology of the recording studio, and the commercial aspirations of the record company" (Howlett, 2009, p.1). The range of skills and attributes required to successfully link and combine these areas may include: creative and performance director, arranger, interpreter, technician, engineer, musician, songwriter, lyricist, close friend, drill sergeant, career advisor and therapist.

Phillip McIntyre discusses the highly collaborative process and the distribution of power in the recording studio, often between the engineer, producer and mixer (McIntyre, 2007). However, there is a tendency for CMM producers to amalgamate the positions of producer, engineer and mixer into one role, rather than two, or perhaps three. In some areas, the range of skills and attributes a CMM producer requires will be the same as those for producers working within other genres of music. Mainly though, it is important firstly that CMM producers have a credible knowledge, and understanding, of the music's commonly shared performance perspectives, sounds, timbres, and practices. Arguably, this can be considered as relating to Nattiez's immanent level of analysis (Nattiez, 1990). Furthermore, a range of skills more specifically focused on the particular requirements of CMM's production aesthetics is required. Arguably, these can be considered as relating to Nattiez's esthetic, as well as poietic, levels of analysis.

The successful acquisition of these skills and attributes will normally be as a consequence of tacit knowledge being gained. Tacit knowledge is explained to be "the unarticulated, implicit knowledge gained from practical experience" (Schmidt Horning, 2004, p.707). Similarly, Schön states that most practitioners "exhibit a kind of knowing in practice, most of which is tacit" (Schön, 1983, p.viii). A reflective commentary relating to tacit knowledge will now be provided. This will be within the context of the empirical approaches, processes and techniques involved in the creation of the portfolio of productions.

## **The Portfolio of Productions – Reflective Commentary**



## **8. The Portfolio of Productions – Reflective Commentary**

### **8.1 Reflective Commentary**

Academics such as Cook (1999, 2010) and Allan F. Moore (2001, 2005) have highlighted the call for musicology to embrace the study of recorded music within the discipline. These scholars have proposed that by moving musicology away from primarily studying the history of composition, and recognising and interpreting the past hundred years of recorded texts, an area of growth would be provided. As Parker states:

The irony of this situation is that notational information has been documented through the use of recorded repertory, but until recently no one has sought to investigate the art of recording or the processes and collaborations, which are instrumental in their creation.  
(Parker, 2011, pp.13-14)

Parker argues that this growth area would engage with far more than simply an understanding of the technology involved with music production. However, as few academics within the field of study are practitioners, it is argued that musicology is not well suited to analysing the processes involved in music production (Parker, 2011, p.18). Due to the author benefitting from over a decade of work producing, engineering and mixing this style of music, the aforementioned challenges are negated.

For the social scientist, or researcher in applied fields, research is a process of trying to gain a better understanding of the complexities of human existence and, in some genres of research, to take action based on that understanding. Through systematic and sometimes collaborative strategies, the researcher gathers information about actions and interactions, reflects on their meaning, arrives at and evaluates conclusions, and usually puts forward an interpretation, most frequently in written form.  
(Marshall and Rossman, 1999, p.21)

Reflecting the strategies outlined in this quote, the author will provide a reflective commentary, as an effective way of contextualising the empirical approaches, processes and techniques involved in the creation of the portfolio of productions. Additional reflections on the production of CMM in general will be presented. This will be written from a first person perspective.

Reflection is a process through which meaning can be given to experiences, thereby providing understanding. Reflective practice, in theoretical terms, can be

understood as deriving from the work of educational theorist Donald Schön. Schön's (1983) *The Reflective Practitioner: How Professionals Think in Action* studies learning systems within communities and organisations in the form of five professions: engineering; management; architecture; psychotherapy and town planning. By focusing on the way that improvisation is learned through being a practitioner, Schön analyses the processes by which these professionals solve problems. Schön proposes, "the knowledge inherent in practice is to be understood as artful doing" (Schön, 1983, p.68) and identifies reflection-in-action, which refers to thinking and adapting to changes in circumstances at the time of occurrence, particularly in pressurised situations, and reflection-on-action, which takes place after the event by analysing what was done and why (Schön, 1983).

Reflection-in-action and reflection-on-action are often achieved through exploring the rationale that relates to questions of how, why, what and by whom (Schön, 1983). This will often take the form of reflecting and relating current experiences with previous similar, or relevant, situations, and by drawing on accumulated tacit knowledge (discussed later). Reflection-in-action and reflection-on-action both figure highly in music productions' procedural methodologies, with reflection-on-action considerably impacted by the ability to critically evaluate the production values of previously concluded projects. This critical evaluation tends to be most effectively carried out following a significant period of time after a project's completion, allowing a more distanced and objective appraisal of the final product's relative merits. This process frequently cultivates a new understanding of the success, or otherwise, of the techniques, approaches, and processes employed during the creation of the relevant project, often yielding a list of changes and refinements of methodology for future projects.

This procedure is often referred to as the experiential learning process, which derives from the work of Kolb (1984). Kolb proposes a working definition of learning to be "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p.38) highlighting the experiential learning process as a "holistic integrative perspective that combines experience, perception, cognition, and behavior" (Kolb, 1984, p.21).

This reflective commentary aims to provide a narrative of reflection-in-action, and reflection-on-action through the experiential learning process. The main questions with which this commentary aims to engage are the following:

- What were the salient patterns, themes or relevant areas of significance during these periods of time?
- Why, and how, are these patterns, themes and areas linked with one another?
- What events, beliefs, attitudes or policies shaped the approaches, processes and techniques employed?

Within the field of music production, numerous studies (Martin, 1983; Cunningham, 1998; Emerick, 2007; Ramone and Granata, 2007; Swedien and Jones, 2009), as well as commercial texts written by journalists or practitioners (Owsinski 1999, 2000; Zak, 2001; Droney, 2003) have provided access to experiences and observations. In many ways, the reflective commentary I will provide, regarding the portfolio of productions for this thesis, will be comparable. In a similar way to these publications, for this work it is assumed that the reader will have some prior understanding of the processes involved with music production.

The productions are grouped into three time periods for collective discussion and analysis. This is due to the projects from each time period being engineered, produced and mixed with a similar methodology.

The projects from the first time period 2002 – 2005 were limited by the fact that I was a novice at producing, engineering and mixing and was therefore naïve in many respects. The second time period from 2005 – 2007 saw the refinement of my processes, approaches and techniques following the realisation that the production standards I had achieved during this first time period were lacking. Despite variations due to the quality of the artists and the performance standards involved, the high commercial level of the productions from the final time period 2008 – 2012 were a result of the tacit knowledge and experience gained since 2002, and the development and honing of the techniques and approaches used from 2005 – 2007.

## 8.2

### 2002 – 2005

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Kill 2 This – Mass Down Sin Drone – Plastic Head Records/USA; Abstract – 2003

Psylence – Through Distorted Eyes – Casket Music – 2004

Everything for Some – A Thought Refused – In at the Deep End Records – 2005

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Experience, to be sure, is the only real teacher in the art of recording. There are so many subtleties to comprehend, so much mechanical finesse to grasp, that no written instructions could ever amount to more than a rough and ready guide.

(Seymour, 1918, p.94)

Despite being written over nine decades ago, Seymour's discourse on the recording and reproduction of sound highlighted the essential nature of experience to these processes. These sentiments have relevance to the standard of production and perceived performance on these fledgling projects from my portfolio.

On reflection, rather than being grounded in experience and knowledge, which Schmidt Horning suggests are the "most important principles of professional recording practice" (Schmidt Horning, 2004, p.705), my production methodology at this time was largely based on emulation. Specifically, this relates to my attempts to replicate, as much as possible, the approaches, processes and techniques employed by Colin Richardson and Andy Sneap, who are world-renowned producers of this style of music. I had worked with both of these producers prior to starting my own work as a producer, and had made extensive notes of their final microphone selection and placements, the equipment used for specific tasks, the processing procedures employed during the mixing stage and the frequency content of certain sources from their productions.

However, when emulating these producers' approaches and techniques, I did this without fully understanding how to most effectively implement these methods for the specific requirements of the audio sources in question. As Huber and Runstein

suggest “If a mic or its placement doesn’t sound as good as it could, make the changes to improve it before you commit it to tape, disk, or whatever” (Huber and Runstein, 2005, p.116) and as Bartlett and Bartlett state “There is no single “correct” mic placement for any instrument” (Bartlett, B., and Bartlett, J., 2005, p.170). Contrary to these sentiments, I would replicate the final microphone selection and placement used by the producers in question, often referring to photos and video footage of the relevant sessions in the process. However this would be without the consideration of alternate microphones, which could have been better suited to the timbre of the audio in question, or adjustment of the microphone placements to most effectively capture the relevant source. Giving thought to both of these variables would almost certainly have resulted in more favourable results than straightforward emulation of the final microphone selection and placement that these producers had employed.

In essence, I lacked the requisite knowledge and experience of the engineering side of audio production at this time. According to Schmidt Horning, “microphoning is a good example of tacit knowledge in action as it is very hard to formalize, and those who possess the skill have acquired it in practice” (Schmidt Horning, 2004, p.710). Tacit knowledge in this respect is explained as the clear understanding of knowledge gained from practical experience (Schmidt Horning, 2004, p.707), which is suggested to be crucial to the work of recording engineers (Schmidt Horning, 2004, p.703).

Similarly, my attempts to emulate the series compression techniques used by Sneap and Richardson at the mix stage lacked efficacy of implementation, again due to my lack of experience and knowledge. Here, I was very much duplicating the compression settings in each instance, the result of which could largely have been achieved by simply implementing one compressor, but doubling the ratio. As my experience and knowledge following this time period increased and improved, I realised that with series compression it is usually far more effective, for example, to set one instance to compress the peaks of the signal with a higher ratio and the other to compress the body of the signal, but with a lower ratio. Similarly, it is generally more effective to vary the attack and release settings of each instance. As Izhaki points out:

If we have two tasks to achieve, why not distribute each task to a separate compressor and have the settings on each compressor optimum for its task? For example, if we wanted to add punch to a snare, but not all the snare hits

are at the same level, we can use the first compressor to balance the level of the performance and the second to add punch.  
(Izhaki, 2007, p.326)

By adopting this approach, a more effective minimisation of dynamic range can be achieved. This would have greatly benefitted, for example, the bass timbres on these albums, which are a weak element of these productions. With more effective implementation of series compression, a more consistent dynamic level would have provided better intelligibility to the bass within the context of the overall mix, and would have allowed the bass to be placed at a higher volume without it protruding from the rest of the mix in an inappropriate manner. In turn this would have provided enhanced sonic weight, and heaviness, to the mix overall, and fuller, more consistent, low frequency content.

A further example of my methodology relying largely on emulation at this time would be my use of an EQ plug-in during the mix stage of these albums that could analyse the frequency content of a source input, and then implement an EQ curve to a chosen instrument to emulate this content. Here, I would allow the plug-in to examine the spectrum of a solo rhythm guitar riff taken from the Machine Head album 'Burn My Eyes', produced by Colin Richardson. The plug-in would then apply an emulation of the frequency content of this audio section to the rhythm guitar group of the album I was mixing. Although I clearly didn't realise it at the time, this approach was seriously flawed and had limited success, as the resulting rhythm guitar sound was deficient in critical areas of low and mid frequencies, and had slightly abrasive and unnatural sounding high frequencies. As Mike Senior has argued '...a good mix EQ setting is not necessarily the one that makes the instrument sound best in its own right.' and '...an EQ setting that worked on one mix can't be expected to work on the next' (Senior, 2011, p.172). A number of years after these albums had been released I revisited one of the final mix session files from the Mass Down Sin Drone album, by Kill 2 This, to experiment with equalising the guitar group without the use of this 'matching' plug-in. On putting into practice the knowledge and experience I had gained during the subsequent time period, I realised that the rhythm sound on the released album failed to live up to its potential by a considerable margin. This was due to the fact that the revisited/re-equalised timbre provided a much-improved overall timbre, with enhanced heaviness and note definition, mainly as a result of the re-equalised guitars having a more effective mid range. A significant minimisation of unmusical, resonant, frequencies in the low-mids at 380Hz, using a tight 'Q' curve, was combined with amplification of the low-mids, at a slightly lower frequency than

where the corrective equalisation was applied, but with a wide 'Q' curve. This resulted in the guitars having a much thicker, denser timbre, but without the qualities that are often described as muddy, which was apparent when the matching plug-in had been used. Additionally, the amplification of high frequency content with the revisited version resulted in less abrasive qualities than in the previous version. The consequence of these different equalisation approaches was a rhythm guitar sound that was not only perceived as thicker and warmer, and lacking qualities often referred to as muddiness, but also clearer, with enhanced note definition. The outcome of this experiential learning process was an avoidance of equalisation techniques, or approaches, that could be considered as emulating existing sounds, and therefore a future avoidance of what could be considered a 'pre-set' mentality.

Due to the heavily restricted budget for these albums, each of the studios used for tracking had particularly poor acoustics. Additionally, my knowledge and experience of drum re-heading, tuning and dampening, was minimal. This subject is discussed at length in 'Sound at Source: The Creative Practice of Re-heading, Dampening and Drum Tuning for the Contemporary Metal Genre'. The poor studio acoustics, and sub-standard drum sounds at source resulted in my decision to heavily rely on the use of drum samples when mixing these projects.

For CMM production, the mark of successful drum sample use is often equated with its transparency, i.e. that it is not immediately apparent that drum samples have been used. From this perspective, poor use of drum samples frequently results in a drum performance lacking the necessary movement of dynamic range and dynamics of timbre that is inherent in even the most consistent of drum performance, with an outcome that inclines towards qualities usually presented by drum machines. Unfortunately, my knowledge and experience of how to effectively use drum samples at this stage was minimal, resulting in a relatively unnatural overall drum sound. This is particularly evident with the perceived snare performance on these albums, as realistic dynamics are lacking during faster fills and buzz rolls. This lack of natural sounding dynamics is often referred to as 'machine-gunning'. Despite the fact that snare samples used were for reinforcement rather than replacement, the lack of realistic dynamics was largely due to this source being too heavily relied upon in terms of level, and that a single sample was used, without sufficient volume automation to address the lack of velocity variation. Additionally, too much reverb level was used on the snare and toms, often with an excessive decay time. This

resulted in overly ambient snare and tom sounds, which have a tendency to sit behind the main mix from a spatial and depth perspective.

Further to the impact of my emulation-based methodology on these early albums, I was failing to give sufficient consideration to the implications that mastering would have for the mixes. I was not monitoring with any form of compression over the master bus, and similarly had not experimented with compression applied to a 'work-in-progress' bounced down stereo mix. Had I done so, I believe I would have realised that the overall bass drum level, which is essential to this style of music production, is often lost due to the compression applied at the mastering stage, and that overdriven quad-tracked rhythm guitar sounds tend to increase in level. With this knowledge, compensations in balance at the mix stage could have been made to take this into account, which would have no doubt resulted in the final productions having a higher standard of overall balance and mix.

Despite these quite significant shortcomings in my knowledge and capabilities during this period of time, the experience and knowledge that I gained was invaluable, particularly from the production of the final album of this period 'A Thought Refused', by Everything for Some, which I feel warrants some specific discussion.

Unfortunately, on commencing the recording of the album, it became apparent that the drummer from Everything For Some was particularly underprepared for the drum performances required. Due to the drummer in question's inconsistencies in the rehearsal and live environment, the rest of the band were insistent on a click track being used when recording the drums. Regrettably, however, the drummer had invested insufficient pre-production time in practicing the album's click tracks, resulting in drumbeats that were not precise enough, and lacked fluidity. The result of these performance issues were drum takes that required a lot of editing and then pasting of good sections, before being able to continue tracking. This editing, pasting and cross fading took up a considerable amount of time, and caused numerous glitches and unwanted artefacts throughout the drum tracks. The reason for these glitches and artefacts was either due to the audio files being time stretched when using automatic quantisation, or due to cymbal hits not naturally sustaining through to the next bass drum or snare hit, due to this hit having been moved to the relevant grid value, when manually slicing and editing. The time taken to carry out improvements to the timing of the drum performance resulted in there being fewer



studio hours available for the rest of the band to complete the tracking of their parts, thereby causing a lot of friction within the band.

This had a considerable impact on my attitude towards the importance of pre-production and how essential it is that, when possible, a producer joins the band during the album rehearsals. Had I have been able to join Everything For Some during pre-production rehearsals for this album, I have no doubt that I would have recommended that they take at least two further months of preparation before entering the studio. Furthermore, I would have stressed the shortcomings in the drummer's ability to tightly and consistently play to the clicks for the album.

Other challenges of the album related to the guitars and bass not being down-tuned as low as I would have liked. This made it a lot more difficult to achieve the requisite density and heaviness to the guitar and bass sounds.

On reflection, although the band were happy with the resulting production, feeling that it was a good representation of the energy of their live shows, I felt that it was a relatively low fidelity production, and had failed to capture the levels of heaviness and overall clarity for which I had hoped.

### **8.3**

## **2005 – 2007**

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Kaizen - Sink – XIII/Bis/Sony – 2005

Thousand Points of Hate – A Scar to Mark the Day – Casket Music – 2006

Head On - XXL –Grind that Axe/Universal - 2006

Everything for Some – Identity – Casket Music – 2006

Gone Til Winter – Demo - 2006

City of God – A New Spiritual Mountain – Requiem Digital Media – 2007

Chaos Blood – Fragments of a Shattered Skull – Siege of Amida Records - 2007

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After completing the production, engineering and mixing of my first three commercially released albums I had the opportunity to reflect on the sonic standards of these projects compared to those of professional producers working in this style. There was no doubt that I was failing to reach these high commercial standards by a considerable margin. In simple terms relating to the three dimensional planes of a mix, as highlighted by Hodgson: “(i) the horizontal (width) plane; (ii) the proximity (depth) plane; and (iii) the vertical (height) plane” (Hodgson, 2010, p.156), my productions sounded narrower, smaller, and lacked depth and weight, as well as CMM productions’ essential characteristics of heaviness and clarity. Therefore, before starting production work on my next project, I took the opportunity to carry out a considerable degree of research in several areas. As well as studying numerous books and academic texts in the area, I had occasion to carry out some invaluable primary research. This included attending tracking and mixing sessions with producers Dave Chang, Colin Richardson and Andy Sneap where I would have the opportunity to ask them about areas where I felt my work was letting me down. Notably, these were: compression; drum sample implementation and use; layering of bass sounds; approaches to quad-tracking and applying equalisation to rhythm guitar performances; and reverb use, particularly on the drums.

I also spent considerable time revisiting previous sessions to analyse what improvements could be made at the tracking stage and experiment with various options to improve the results of the mixing stage. One of the results of this analysis was a simple reflection that the bass, snare and tom sounds I was capturing at the tracking stage were clearly lacking. Due to my certainty that each drum sound was fairly representative of the relevant source during the performance and the recording, it seemed clear to me that I was failing to get the drum sound right at source. This subject is discussed at length in the ‘Sound at Source: The Creative Practice of Re-Heading, Dampening and Drum Tuning for the Contemporary Metal Genre’ publication, as well as both of the first articles for Sound on Sound and Guitar World, where drum tuning, as well as engineering for this style of performance and timbre, are discussed at length.

As mentioned in the 2002-2005 section of this chapter, it was clear that some considerable improvements needed to be made to the distinctly sub-standard bass sound I had achieved on my earlier productions. It was from this point onwards that I started using a greater number of sources than the traditional direct injection and

microphone combination. A further layer would be provided by software, or hardware, bass amplifier simulation, usually the Sansamp PSA-1 in both instances. This would provide a different timbre and frequency content, helping provide a denser sound. Additionally, a further layer of bass would be added in the form of a heavily distorted signal via a distorted amplifier recorded with a microphone, or again the Sansamp PSA-1. The approaches to processing these differing bass layers, and particularly the distorted element, are fully discussed in item five. Furthermore, the subject of capturing and presenting bass textures, and how these can be processed to appropriately interact with the bass drum, is fully discussed in item six.

A further area where my skills needed improving was in my engineering and processing of rhythm guitar sounds. Michael Beinhorn discusses the challenges as follows:

The electric guitar is a very complex sound. How the distortion works and what you do with it are key to being able to understand it. Distortion is a very important thing in modern recording. Things like how it's dealt with, what function it serves, where it sits in the mix, and how you get separation are all important.

(Beinhorn, 2009, p.261)

Therefore a period of research into the engineering stage of quad-tracking rhythm guitars ensued. I experimented with various techniques in a home recording context by re-amping different DI rhythm guitar parts into various amps/cabs and microphone combinations. Previously my approach would be to simply record four takes of rhythm guitar after acquiring what I considered to be a good sound from the amp, cab and microphone. One of the first results from this period of experimentation, as fully discussed in the first Sound on Sound and Guitar World articles, is that it is favourable to use slightly less gain than normal for each take. This is due to the distortion characteristics from four rhythm guitar takes, often seeming to obscure the nuances of the performance. Furthermore, it is beneficial to vary the sound between each of the two takes per side, as this will assist in achieving a thicker, denser and heavier overall rhythm guitar sound. Again, approaches for appropriate variation of the rhythm sound are fully discussed within first Sound on Sound and Guitar World articles.

I also carried out wide-ranging research and experimentation into the mixing process at this time, with extensive investigation into the use of equalisation at the channel and/or group stage. With instrumentation such as the snare drum, for

example, which can be treated with quite extreme levels of equalisation without sounding inappropriate, individual equalisation on the snare top, snare bottom and snare sample was compared with equalisation on only the group, or channel and group equalisation combined. Similar comparisons were then made with equalisation at the channel and/or the group stage on quad tracked rhythm guitar sounds. These equalisation issues are discussed in full within the second Sound on Sound and Guitar World articles, as well as the ebook chapter 'Intelligent Equalisation Principles and Techniques for Minimising Masking when Mixing the Extreme Modern Metal Genre'.

The experience and knowledge I gained during this time were put to use for the production of the second Kaizen album 'Sink'. Despite the challenge of achieving a high perceived standard of drum performance and the particularly high number of edits and kick drum 'building' techniques involved, I still feel that the drum sound was strong. These edits and kick drum 'building' techniques are discussed as part of the case study in item one. I also believe that the bass sound was of a much higher standard than on my previous three productions, providing more consistent, heavier and denser low frequency content. The successful introduction of an appropriately processed and equalised separate channel of bass distortion added an element of aggression to the production, and assisted in allowing the bass to successfully 'sit' with the guitars within the mix. This enabled a higher overall bass level to be used, without sounding inappropriate or protruding from the mix and providing better 'weight' to the overall production. The rhythm guitar sounds on the album reflected the successful technique of varying the guitar and/or amplifier whilst quad tracking, whilst retaining an appropriate level of gain on each take. This enabled a dense, heavy rhythm guitar sound, which retained note definition. In order to process the vocal timbre to make it 'sit' appropriately with this sonic-wall of rhythm guitar, distortion was inserted over the vocal group, in the form of the Pro Tools' plug-in Lo-Fi. This distortion provided the vocals with a timbre that was more concurrent with that of the rhythm guitars, due to harmonic content generation and dynamic range reduction, providing a quality to the vocals that is often perceived as aggressive. On reflection I feel that the mix and standard of overall production of the Kaizen album was the first that reached the high commercial standard that the style requires.

An additional successful approach that I employed for the Kaizen album was the use of a mobile Pro Tools rig at the mastering stage, which was taken to the mastering studio to take care of any issues with the album's final mixes at source.

This was in response to my lack of consideration to mastering in my earlier productions. By analysing the level and frequency changes from the session files before and after mastering, my knowledge of the impact of this final process was increased. The level changes reflected a requirement for the bass drum (in particular), snare and bass guitar to be foregrounded to a higher volume level than had previously been used. This was due to these elements being heavily impacted by mastering compression and limiting, resulting in a reduction of overall volume level within the context of the production. Conversely, the rhythm guitar levels seemed to be increased by the mastering process, thereby requiring a degree of attenuation. Also, any significant equalisation boosts below 70Hz were seemingly exaggerated in an undesirable manner by the mastering processing. This emphasised the importance of avoiding, or controlling, the unnatural accumulation of low frequencies, and also the importance of monitoring that would allow the accurate assessment this region of frequencies. Furthermore, it became apparent that the perception of reverb and delay was significantly emphasised by the mastering, requiring these elements to be attenuated. This emphasised the need to give suitable consideration to the impact of mastering, which from this point onwards, was reflected in my use of master bus compression from the very early stages of the mix process.

I was not involved in the engineering and recording of the Thousand Points of Hate EP 'A Scar to Mark the Day', as I was only brought in for the mix of this EP. It therefore provided a perfect opportunity for me to develop my mixing skills, and utilise the processing and equalisation experience and knowledge I had gained during the Kaizen mix. This was particularly relevant in areas where the qualities of the recorded sounds were less than ideal, as was the case with the drums and bass. Again I made the decision to master the EP directly from a mobile Pro Tools rig, as this had provided distinct benefits to the mastering of the Kaizen album.

The Head On album XXL was the first project I produced in which I could apply my knowledge and experience of pre-production as well as my research and experimentation with drum sound at source; specifically drum re-heading, tuning and dampening. I had heavily laboured the importance of pre-production to the band, resulting in them being well prepared for the recording of the album. For example, the drummer had already re-headed his drum shells and played them in during the previous evening's brief rehearsal, allowing for a focus on drum tuning, rather than re-heading, during the first day in the studio. Having reflected on my previous drum

recordings, I took a great deal of time, in collaboration with the drummer, getting the drum heads tuned to a high standard before any microphones were set up. This had a clear impact in lifting the standard of the drum, and overall, production. The only notable problem area with the recording of this album was with the vocal performances, as the vocalist had a very weak voice, with quite severe pitching and lack of stamina issues. These challenges were largely dealt with by scheduling the recording of the vocals over as long a period of time as possible. Further discussion relating to this can be found within the first Sound on Sound and Guitar World articles. Again, my knowledge and experience of the use of drum samples and gaining the most appropriate separate bass sources, and quad-tracking rhythm guitars, was put to good use, which made for a relatively straight-forward mix.

I was determined to achieve a much higher standard of production on the second Everything for Some album 'Identity' than on their debut album 'A Thought Refused'. I believe that the drum sound on this album is of a particularly high standard, and provides a solid foundation for the other elements of the production.

Although the production for the band Gone Til Winter was a demo and was not commercially released through a record label, I still felt it important to include this in my portfolio of productions. Gone Til Winter feature a female vocalist and this provided valuable experience not only in recording female vocals, but also the considerations of different tonality and frequency content when placing a female vocal within the context of heavy, layered guitars. Other considerations, for example the higher frequency range of sibilance than that generally found with male vocals, found to be just below 8kHz for the female vocal in question, also factored into this learning experience.

The mixing stage of the City of God album 'A New Spiritual Mountain' provided a number of challenges in gaining the requisite heaviness, weight, clarity and note definition of the bass and rhythm guitar. This was due to both suffering from deficient low frequency content in the 60-120Hz region, and the guitars, particularly, had muddy low-frequency content. Fortunately, the bass and rhythm guitar direct injection signals had been recorded, and I was able to re-amp them both. The ability to concentrate on amp settings and multiple microphone placements with a final performance section on loop was highly effective, resulting in relatively minimal equalisation being required when mixing. Further discussion of re-amping can be found in the second Guitar World article on mixing.

In striving for a 'heavy' mix, many producers will excessively amplify inappropriate low-end frequencies, resulting in an uncontrolled low end that is often described as boomy. Alternatively, a mix with a deficiency of the correct bass frequencies will lack sonic weight and heaviness. In the case of the ChaosBlood album, which I partly re-recorded with the band and then mixed, the band members and engineer had excessively boosted the low frequencies at source of both the bass and rhythm guitar tracks in an attempt to gain a heavy production. Unfortunately, this resulted in uncontrolled and boomy bass and guitar timbres, even when applying high pass filters far higher than the guitar or bass' fundamental frequency. Additionally, the DI signals from the previous recording sessions, which would have allowed for re-amping, had not been recorded. I therefore decided that I needed to re-record the bass and rhythm guitars if I was going to achieve a quality production. ChaosBlood's music is based around very high song tempi, tremolo picking, very quick note subdivisions, fast double bass drum work and a high level of accentuation and synchronisation. It was interesting for me to note the techniques required to provide definition and intelligibility, which is fundamental to retaining, and providing, clarity in performances and a perception of advanced standards of musicianship being present. As discussed in the second *Sound on Sound* and *Guitar World* articles, as well as the *Fundamentalisms* ebook chapter, the foundation to getting the heaviness of a CMM mix right is creating a specific space for each of the sound sources within a mix. In practice, this required extensive use of high pass filters across all instrumentation for this production, and automation to move the filter even higher in the instance of fast extended sections of double bass drum performance. This was to counteract the build-up of low frequency content on these faster sections. Despite the fact that retaining clarity of performance was a particular challenge for this production, I feel that it more than stands up to the production standards of albums completed with considerably higher budgets than this, by some of the world's top producers in the style.

## 8.4

### 2008 – 2012

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For Untold Reasons – Oubliette – Self-Released – 2008

Godsized – Brothers in Arms – Self-Released – 2008

Godsized – The Phony Tough and the Crazy Brave – Self-Released – 2010

NG26 – Open Your Mind – Holier Than Thou Records – 2010

Godsized – Berzerkus – Jaegermeister Records - 2011

Ecthirion – ‘Eagle’s Wings’ – Self-Released – 2011

Nothing Gained – Hollow Rhetoric – Self-Released – 2012

天靈靈地靈靈 – Evocation – Self Released – 2013

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The tacit knowledge gained from ChaosBlood album, very much prepared me for my following production project. This was for a band called For Untold Reasons whose performance perspectives, sounds and timbres were similar to ChaosBlood’s in many ways.

The problems that I had encountered with the drum recordings for the ChaosBlood album, which I had not engineered or recorded myself, mainly revolved around the fact that the band had not re-headed or properly tuned the kit prior to commencing tracking. Furthermore the bass drum and tom drum shells had not been tuned low enough, and caused these drums to resonate excessively. With excessive resonance, perception of the transient attack element of drum sounds, which is essential for the clarity and definition of fast, complex performances, is diminished. Further discussion on this subject can be found in the ‘Sound at Source: The Creative Practice of Re-Heading, Dampening and Drum Tuning for the Contemporary Metal Genre’ publication.

Having dealt with problems relating to poorly tuned drum sounds during the mix stage of the ChaosBlood album, I was very focused on this element of the recording process for the For Untold Reasons project. The drum sounds on the resulting EP are of a very high standard and are comparable to those found on productions by



professional CMM producers, for example the previously mentioned Colin Richardson and Andy Sneap.

I once again took the decision to re-amp the rhythm guitar tracks for this EP since I deemed the sounds I had captured at the tracking stage as sub-standard. This was largely due to the guitarist's insistence that they use their Line 6 amplifier and loudspeaker combination for recording. On presenting the band with a comparison between the originally recorded sounds through the Line 6, and the re-amped versions through a Mesa Rectifier and Peavey 5150, they were more than happy to use the latter. The guitarists were drop-tuned down to 'B', which presented a challenge in getting the requisite note definition in the low frequencies. When re-amping these guitar tracks I was surprised to find that the optimum distance to achieve these qualities was approximately eight inches from the grille of the loudspeaker cabinet, which is a much greater distance than I had previously used. With the right sound at source coming from the guitar amplifier and loudspeaker cabinet, this distance of eight inches was required in order to avoid proximity effect, which was a considerable factor here due to the low tuning.

Having experienced the excessive low-frequency content of the original bass recordings of the ChaosBlood album, I focused the bass amp settings for the For Untold Reasons EP more towards mid frequency content, and I consider this to have been a good decision, as the bass sits well with the guitars and within the overall production, whilst still retaining intelligibility within the mix.

During the mixing of this EP my awareness of masking (see the second Sound on Sound and Guitar World publications, as well as ebook chapter for further discussion) was much improved. I was giving priority to equalisation decisions whilst having the relevant element placed within the context of the overall production. I believe that this approach was successful.

With such a dense and aggressive mix instrumentally, it was quite a challenge placing the vocals in the mix. High levels of series compression with an element of distortion, as discussed the second Sound on Sound and Guitar World articles, helped with this process.

The three productions for the band God-sized represent, in my opinion, the highest standard of overall production in this portfolio. An element of this can be attributed to

Godsized's high standard of professionalism and performance whereby each member of the band were able to play precisely and consistently. This reinforces the view that in many respects:

Recording is parasitic. Engineers are both enabled and limited by the clients they rely on for the raw materials of their art and the sustainability of their profession. For most intents and purposes, it is an art without content.  
(Reyes, p.16, 2008)

This clearly points to the fact that despite a producer's various talents, they are still limited to a large degree by the quality of musicianship of the artists they are producing.

From a drum tracking perspective, I had worked with the drummer from Godsized previously, as he was formerly in the band Head On whose debut album I had produced. His ability to play precisely and consistently to a click track had improved greatly since the Head On album, mainly as a result of him practicing hard to rectify the problems he had encountered during the recording of that album. In essence, the impact of this was a very high standard of drum performance and one that provided a strong foundation for the production.

The only problems of note encountered with the production of the Brothers in Arms EP were the slightly sub-standard performance of the bass parts, particularly compared to the standards achieved with the drums, guitars and vocals. In general, the bass was not synchronising with the bass drum as precisely as it should have been and sections of alternate picking were not executed cleanly enough, slightly blurring the intended subdivisions. For this reason, the bassist was replaced following the completion of this EP. For the 'Berzerkus' EP, which features all five of the productions from 'Brothers in Arms' in addition to the three songs from the 'The Phony Tough and the Crazy Brave' EP, the bass parts were re-recorded by the new bassist. This additionally required the songs to be re-mixed and therefore re-mastered. It is interesting to note that, following the recording of the new bass parts, I had incorrectly assumed that the mix process would involve nothing more than simply sculpting the bass sound to fit appropriately into the rest of the instrumentation from a tonal, frequency content and dynamic perspective. In practice, even after doing this, numerous alterations were still required in order to get the instrumentation, and overall production, to gel and 'sit' together appropriately. Mainly it was the equalisation of the bass drum and rhythm guitars that needed to be

revisited. On reflection, the fact that these changes were required supports the paradigm that audio sources are highly impacted by the context in which they are placed. Clearly in this instance, the significantly different timbre of the bass guitar influenced the manner in which the rest of the productions instrumentation was perceived, thereby requiring the adjustment of the frequency content of these elements.

I feel that there are numerous reasons why I achieved this level of production for Godsized, in addition to the previously mentioned high standard of the band's musicianship:

- The comprehensive pre-production that was carried out for both EPs, but more particularly 'Brothers in Arms'.
- My drum re-heading, tuning and dampening skills had improved greatly since earlier productions.
- A greater degree of consideration to sound at source for the guitars and bass, ensuring appropriate frequency content and levels of gain.
- My microphone selection and placement experience had improved greatly, as had my knowledge of utilising room microphones, and creating drum samples from the drum kit used for tracking.
- My experience in ensuring that the right equipment is used for each task had greatly improved.
- The research I had carried out into varying guitar sounds when quad-tracking rhythm guitar were providing a heavier sound with improved note definition.
- As was discussed by Andy Sneap during the video interview, I had started using compression during the vocal recording stage. Although this was only providing between 3 and 4 dB of gain reduction with a high threshold to compress only the peaks, this was highly effective in controlling dynamic range when combined with the compression used at the mixing stage.
- Due to the improved drum tonalities captured at source, a lower level of drum samples for reinforcement could be implemented. Despite what I consider to be a high standard of overall drum sound, this lessened reliance on drum samples resulted in a more natural sounding kick and snare tonality, and more realistic dynamics to the snare performance.

- The two kick-drum and two snare drum samples that were used for reinforcement consisted of one of these samples being taken from the drum kit used for tracking. Again, this assisted with the more natural tonality of the kick and snare.
- I feel that my techniques used for providing an element of distortion to the bass sound had improved over the previous five years to this production, with a more focused and effective attenuation of the unwanted frequencies from this source.
- My increased experience with series compression techniques provided a more appropriate dynamic range to the bass sound, providing improved consistency and power to these productions.
- My experience with using intelligent EQ and anti-masking techniques had significantly improved, providing improved heaviness and definition of the instruments within the context of the production.
- A much higher priority was given to equalisation decisions made whilst having the relevant element placed within the context of the overall production.
- Due to my experience with implementing an element of distortion to the vocal sound, along with more aggressive series compression techniques, the vocals sit at an appropriate level and with an appropriate tonality within the dense, harmonically rich, quad-tracked guitars.
- The implications of the mastering stage, which were not given due consideration on my earlier productions were now a major consideration during the mix stage. In practice, compression was firstly being used over the master bus to give a general indication of the impact of the compression used during the mastering stage. Additionally, time was spent analysing a work-in-progress mix with the all-in-one mastering plug-in Ozone applied. Again, this provided a general indication of the impact that the same processes would have, but applied by a professional mastering engineer (further discussion of this approach is found in the first Sound on Sound and Guitar World articles).

The remaining four productions from this time period are the co-mixing of the album 'Open Your Mind' by NG26, the mix of the track 'On Eagle's Wings' by Echthirion, the production, engineering, mixing and mastering of the album 'Hollow

Rhetoric' by Nothing Gained, and the mixing and mastering of the self titled debut album from Evocation, CMM artists from Hong Kong.

The band NG26 had wanted a production with a similar sonic weight to the God-sized EP 'Brothers in Arms'. The producer who undertook the initial mix of the album, who had also recorded the project, had not provided this standard of production. Myself, and co-mixer Steve Fenton, took on this remix with the former mainly carrying out the required work on the drums, bass and guitars, whilst the latter carried out the vocal processing, final adjustments and mastering. The main challenge to gaining a high sonic standard of mix for this album was the lack of punch with the kick, snare and tom spot microphones. Overall, the drum recording seemed to fail to capture the essential nature of these drums, despite the fact that the timbre of these elements were found to be quite acceptable on the overhead microphones. A long time was spent on drum sample selection to most appropriately reinforce the areas where the spot microphones were deficient. Eventually, a mix of two kick-drum and two snare drum samples were utilised. In the case of the toms, a single sample for each of the toms was used, but in this instance the tom spot microphone recordings were poor enough to warrant replacement, rather than reinforcement. The bass direct injection signal and amplifier/cabinet recording was acceptable; however, amplifier/loudspeaker/microphone emulation was used on a duplicated direct injection track, as was an element of distortion again implemented on a duplicated DI track (see the second Sound on Sound and Guitar World articles). Despite the rhythm guitars only being double tracked, rather than quad tracked, the sounds, weight and note definition were found to be of a high standard. A relevant degree of corrective and creative equalisation resulted in a very workable rhythm guitar timbre.

The Echirion mix, which is representative of a subgenre known as symphonic metal, has been included here, due to the specific challenges that this mix presented. The project featured extensive live, as well as programmed and sampled, orchestration, in the form of keyboards, violins, cellos, oboe, trumpet, trombone, tuba, timpani. Not only did this result in a high channel count of well in excess of a hundred tracks, but the use of EQ and control of the dynamic range was essential so that this orchestration was still intelligible when placed in the context of double-kick drums and down-tuned and dense harmonically-rich rhythm and bass guitar sounds. An additional challenge with this mix was the manipulation of the vocal so that it sat correctly within the mix. Here, the performance was very clean, with what I

considered to be not enough emotion, energy, or commitment to the lyrics. As already stated, a clear and often overt presentation of emotionality as a display of authenticity, usually through tone of voice, has always been a pre-requisite of vocal performance for the metal style (Weinstein, 1991, pp.26-27). In an attempt to counteract the lack of perceived aggression, a high level of distortion in the form of the lo-fi plug-in was applied to the vocal.

In discussing and analysing the production of the Nothing Gained album 'Hollow Rhetoric', it is first of all relevant to present some of the closing comments from The Sound on Sound Guide to Recording and Producing Modern Metal:

As a general principle, even in extreme metal genres where the use of samples and editing is commonplace, a production that has a relatively faithful and honest reproduction of the original tones and performances will usually sound a lot more impressive than one that has been heavily manipulated and processed. Also, although the technical aspects of engineering are, of course, important, the ultimate quality of a production has much more to do with the band's musicianship and attitude and the commitment of the performances involved than, for example, the type and position of the microphones used to capture this.

(Mynett, 2009, p.133)

These sentiments are highly appropriate to the production of the Hollow Rhetoric album, which is of a significantly lower production quality than other projects from this time period, and in particular, that of God-sized. This lower quality of production is directly due to the high levels of processing of the sounds involved, and high levels of manipulation of the album's performances. On reflection it seemed that the entire band, with the exception of the bassist, had written parts that were outside of their individual capabilities as musicians. For example, the drummer was unable to perform the numerous faster sections of bass drums heard on the finished album and was additionally unable to perform his, often relatively complex, parts to a click track to an appropriate standard of accuracy and tightness. This resulted in considerable kick building being carried out, and the complete editing and quantisation of the entire album's drum performance. Similarly, due to the drummer in question struggling to perform the majority of drum parts comfortably, there were numerous inconsistencies with the strength of hits with his hand-work, resulting in poor tonality which required a greater reliance on drum samples than I would have liked.

Both rhythm guitarists had considerable problems playing the fast note subdivisions of many of the album's guitar riffs, requiring manual edits and copying of

accurately performed parts. Even more challenging was achieving the rhythm guitar performances required to track each of the player's first rhythm takes, in order to provide quad-tracked guitars. This required a similar level of edits as required for the first performances. Furthermore, the rhythm guitar sounds left a lot to be desired, mainly as a result of poor playing technique and written parts that were outside of their individual capabilities as guitarists. This resulted in particularly high levels of corrective and creative equalisation, which was required in order to gain a satisfactory rhythm sound.

Due to limitations of range, power and stamina, the female vocals heard on the final album rarely feature more than a single line of consecutively performed vocals. In many instances, multiple takes of up to sixteen separate performances were compiled into one performance, sometimes with only a few words from each take, and on several of the album's tracks, the vocals consist of vocal performances recorded over several different days. Furthermore, many of the vocal performances feature two or more separate vocal performances at the same time. This was to provide a thicker sound, but at the expense of vocal inflections, which are often lost, or obscured with 'tracked-up' vocals. Additionally, a considerable level of equalisation, automation and compression was required in an attempt to provide the vocals with consistent dynamics and timbre.

As stated, this heavy processing and manipulation resulted in a relatively unnatural sounding, inorganic production, and one that ultimately is far less impressive than other productions from this time period.

Finally, the mix and mastering for the debut album by Evocation, a band from Hong Kong, was facilitated by the guidance I was able to provide, concerning the recording of the album. The band carried this out in their rehearsal space. A relatively poor sound to the drums, reflecting poor tuning and a far from ideal recording environment, resulted in a heavy reliance of drum samples for the mix. This was particularly the case with the snare, which was impacted by a snare top microphone source that had such a high level of resonant, unmusical frequency content as to be unusable. The well-recorded bass and rhythm guitar DI signals allowed me to successfully re-amp these signals and fortunately the vocals were relatively well recorded. The band, as requested, had taken steps to minimise the impact of unwanted reflections by suspending blankets and duvets around the microphone. As can be heard on the mix of the song '天靈靈地靈靈', which is Track 18 of the portfolio

of productions, the vocals are sung in Cantonese. Additionally, there are samples and sound effects used, particularly during the middle section of the song, of Chinese rather than Western origin, reflecting the band's cultural influences.

The members of the band had requested that their own production sound very similar to the album 'Evangelion' by Polish band Behemoth, mixed by Colin Richardson. On analysing the mix for this album, it was clear that the guitar sounds had a heavily attenuated low-mid range sound, frequently referred to as scooped. Furthermore the album's cymbals are very present in the mix, as is the high frequency content of the instrumentation in general.

This analysis, combined with the ability to make direct comparisons at the mastering stage, resulted in me adopting what Izhaki refers to as an iterative coarse-to-fine mixing approach:

We start with coarse treatment on which we spend less time, then as the mix progress we refine previous mixing decisions. Most of our attention is given to the late mixing stages where the subtlest mixing decisions are made. There is little justification in trying to get everything perfect before these late stages – what is perfect at point might not be that perfect later.  
(Izhaki, 2007, p.39)

It was only in the later stages that I needed to make more specific, direct comparisons to the Behemoth production in order to analyse the differences in instrument levels and frequency content. As Izhaki highlights, it was therefore at this point that refinement of previous mixing decisions were made, and where the subtlest decisions were implemented in order to accurately emulate the Behemoth production. Consequently, the standard of the Evocation production is comparable to Behemoth's Evangelion album in many respects.

## **8.5 The Transition from the Emulative Stage to Professional Level of Music Production**

It is important to conclude this reflective commentary by highlighting the most essential factors, and requirements, for making the transition from the emulative stage to professional level of music production. This transition could alternatively be viewed as a move from a novice standard to high commercial standard of production.



The most significant of all these factors, was an approach that allowed me to realise that the techniques and approaches based on emulation were not as effective as those based on the specific requirements of the relevant audio.

During the initial time period, referred to as the emulative stage of my production practice, the main focus of this emulation tended to relate to visual, rather than aural, perspectives. I will present two examples related to the recording and mix phase to demonstrate this point.

- At this stage of my work as a practitioner, I was able to emulate the make and model of microphones and their final placements employed by these producers (often through photographs taken during past recording sessions). However, I was unable to conceptualise and fully understand the processes that the producer went through when selecting and adjusting these microphones in order to effectively capture the source.
- Similarly, I was able to emulate the make and model of a particular compressor that was used, where this was inserted in the signal chain, and replicate the attack setting implemented (often through studio notes). However, I was unable to fully understand how, for example, the attack setting was adjusted according to the characteristics of the source.

In these two examples, there was an element of my being able to hear and analyse the impact of the microphone or compression changes being carried out. However, at this stage of my development as a producer, I lacked the tacit knowledge required to make the connection between the ways the microphone selection/placement or compressor parameters were being informed by the qualities of the audio source itself. Therefore on subsequent sessions, when I was in the role of producer myself, I could only resort to this form of 'visually-based' emulation, without being sufficiently able to understand how these techniques and approaches were informed in the first instance by aural perspectives. This emulative approach therefore reflected what could be considered a pre-set methodological style of production. The adopted techniques weren't informed by anything other than an assumption that, because I'd witnessed their effective use elsewhere, they would somehow produce a similar result on other projects.

As explained in section 8.3, following this emulative stage I spent a period of time carrying out reflection-on-action, which takes place after the event by analysing what was done (Schön, 1983). An example of this reflection-on-action, concerning the mix stage, will demonstrate the overarching principle that facilitated the transition toward achieving a professional level. As discussed, I spent considerable time revisiting previous sessions to analyse what improvements could be made at the mixing stage. I would firstly make the previously applied processing inactive. Then a considerable amount of time was spent just listening to a relevant audio source both in isolation, as well as within the context of the full mix, before ascertaining the deficiencies of this audio source. A further considerable period of time was then spent with the relevant form of processing to correct what I perceived was deficient. By then making direct comparisons between this approach and the emulative based processing, the considerable shortcomings of this emulative approach were immediately clear. A much higher standard of tones was achieved, and importantly these were a lot more effective within the context of the mix. Hence, a greatly enhanced understanding of how to achieve a higher commercial standard of production was enabled and, additionally, tacit knowledge was acquired within the process.

The foremost principle allowing an improvement to my earlier emulative techniques was rooted in arguably the most 'low-tech' – listening and analysis. The processing decisions would then be based on the results of this listening and analysis. In contrast, my emulative methodology tended to largely disregard the specific requirements of the audio in question, and, importantly, largely disregard how effective the sound source in question was within the all-important context of the rest of the mix. This relates to a frequent novice error of spending too much time processing audio sources in isolation, rather than giving priority to these decisions whilst the audio element is analysed within the context of the mix.

The precept of basing almost every engineering, production, and mix decision on the results of careful listening and analysis, rather than some pre-set idea about the 'right' way of carrying out a task, became engrained in my ethos as a producer. In combination with the tacit knowledge gained in the process, this was central to my transition from the emulative stage to professional level of music production.

Despite the shortcomings of my earlier emulative approach, it is important to provide balance to this discussion, as this approach provided me with many foundational concepts, particularly when it came to mixing. One such example was

my realisation of just how much high frequency content is usually presented in high commercial standard CMM production. This was often realized through my use of the 'matching' EQ plug-in, discussed in section 8.2. This would analyse the frequency content of a source input, and then implement an EQ curve to a chosen instrument to emulate this content. On inspecting the curve applied, I was constantly surprised at how much high frequency content was being amplified. Additionally, through using this plug-in across a final mix, and matching the frequency content of high standard productions, I gained an understanding of the correlation between density of timbre and speed of subdivisions, and the low-end frequency content of CMM. Very simply, the faster and denser the performances and timbres involved, the more controlled and 'rolled-off' the low frequency content tended to be.

## 8.6 Originality

It would be contentious to claim that certain productions within the portfolio provide an original presentation of CMM heaviness. As Reyes notes, "recording is *parasitic*. Engineers are both enabled and limited by the clients they rely on for the raw materials of their art" (Reyes, 2008, p.16). I would therefore propose that an entirely original CMM production style would be highly informed, or restricted, by the performance's perspectives, sounds, timbres and practices of the artists involved. Whilst many of the artists featuring in the portfolio of productions are far from being purely derivative in terms of style and sound, it is deemed unlikely that any of them would make claims as to having an entirely original sound or performance perspective.

Despite this, I believe there are aspects of originality within individual elements of the later productions. Due to my practice of mainly utilising drum samples that are created from the drum kit used for recording, combined with these being used for reinforcement, rather than replacement, I believe the drum sounds on the later productions have a more natural sound than generally heard within this production style. Although relatively heavily equalised during the process of my creating these drum samples, they remain consistent with the natural timbre of the relevant kick or snare drum source. Given that these samples were taken from the kit used for tracking, this is not entirely surprising. Importantly though, these drum samples reflect time spent on tuning and dampening drums at source, rather than simply

choosing a drum sample from a commercially available library. This has enabled drum sounds that I believe will tend to be perceived as more natural and unmediated.

In CMM production, bass timbres are frequently considered as being far lower in order of importance than the drums and guitars. However, I feel that the bass sounds on my later work are a particular strength of these productions, and an original element of my production approach. The strengths of these bass tones revolve around high intelligibility, but combined with heavily sculpted distortion elements providing an aggressive, but clear, bass tonality. Additionally, in many of the productions, for example *Godsized*, *Everything for Some* and *Gone Til Winter*, the bass guitar is foregrounded to a greater degree than is generally the case in this style of production, yet this doesn't lessen the impact of the rhythm guitars. This separation was often challenging due to the bass and guitars being down tuned, frequently resulting in the guitars' fundamental frequency being within a range often reserved for the bass. The separation provided was as a result of careful sculpting of the space and place where the bass sits within the kick drum and rhythm guitars. I believe this reflects a higher level of intelligent EQ techniques than is generally used in the production of this style. Similarly, the intelligibility of the vocals on the later productions was facilitated by the use of mirrored EQ techniques. This is a principle that is also considered as intelligent EQ. Here, the attenuation of frequency content in the rhythm guitars was mirrored with the same range being amplified in the vocals.

Phase and time alignment is an area where frequent novice errors are made. These mistakes inevitably result in a hollowing-out of frequencies, which is usually the polar opposite of the impact required for the sounds involved in CMM. On receiving albums to remix where phase and time alignment mistakes have been made, the relevant producer will have usually attempted to address the resulting hollowed-out frequencies with considerable EQ boosts. This tends to result in the relevant sound sources being perceived as unnatural sounding. In my own practice, I go to considerable lengths to maximise phase summation and time alignment, and far more so than other CMM producers I have spoken with and interviewed. Examples include:

- Experimenting with time alignment between double miked sources, such as the kick and snare drum.
- Experimenting with time aligning the snare and overheads, usually just two to three milliseconds, to increase the low frequency content of the snare.

- Making sure that the drum samples, usually just kick and snare, have had their phase relationship with the spot microphones fully exploited.
- In addition to the essential time alignment of bass DI and bass cabinet microphones, ensuring that precise time alignment of the collective various bass layers has been carried out.
- At the rhythm guitar recording stage, two coincident microphones are usually used, often a Shure SM57 and Sennheiser MD421. However, before commencing recording, precise time alignment between these microphones is carried out. To do this a source with a sharp transient, such as a cowbell, is routed through the guitar cabinet and recorded. This allows the time alignment to source relationship between the double microphones to be accurately assessed and precisely aligned.

The relevance of all this time investment in phase and time alignment is that fuller frequency content is frequently enabled. This thereby minimises the required levels of corrective and creative equalisation, enabling a more natural sounding result. I believe that this is an original element of my production methodology. With the exception of the earlier productions as well as *Nothing Gained*, which was heavily impacted by poor performance, I believe that this has provided production aesthetics that are generally more natural sounding, less processed and present a more organic feel than is normally the case within this style of production.

In conclusion, the original elements of my production work are highlighted firstly as an organic aesthetic. This is combined with a prominence, and focus, on clear and well-defined, but driven bass timbres, which contribute to the essential characteristics of both heaviness and intelligibility. These specific approaches, processes and techniques relating to these qualities are fully discussed within the publications for this thesis.

# Conclusions

## 9. Conclusions

Metal music has shown that it is a significant musical and cultural field, with a forty-year history that demonstrates the longevity of this music's appeal. However, the existing literature and academic study into its importance and relevance has tended to highlight historical, anthropological and sociological perspectives, rather than focusing on the music itself. In contrast, the main aim of this research was to provide a comprehensive production methodology for CMM.

CMM's defining and essential feature of 'heaviness' is primarily substantiated through its displays of distortion and, regardless of the listening levels involved, the fundamentals of this identity are inherently linked to volume, power, energy, intensity, emotionality and aggression. CMM's low frequency sounds are associated with large, intense and powerful entities, which also occupy considerable height on the vertical plane. The perceived performance environment derives much of its sonic impact from the listener having the sense of utmost proximity to the band and the relevant sounds involved. A high level of energy is usually perceived as being expended in this performance environment; however, it is important that this energy is presented in a controlled manner.

CMM has an inclination towards the use of high tempi and fast subdivisions, with an overall focus on ensemble synchronisation. To maximise the potential for accurate ensemble synchronisation, drum performance precision is important. This frequently takes the form of straight, metronomic performances, with minimal, or no, expressive timing variations in the performance. The use of a click track can facilitate performance precision, by providing a pivotal orientation point for the performer, and also provides a central reference position for the producer to assess this precision. Additionally, the use of a click track enables a variety of recording, editing, quantisation and kick-pattern building methods to be employed. These can create the illusion of drum performance precision and accuracy.

CMM's often rhythmically concentrated drum patterns are placed within the context of down tuned bass, and heavily distorted, down tuned rhythm guitar sounds. It is important that the drums retain depth, sonic weight and intelligibility within these textures. This can be accomplished by tuning the batter and resonator heads of the bass drums and toms in the lower ranges, and so that they interact to produce short

sustain. This provides depth and emphasises the drums' transient attack. CMM productions tend to exhibit a relatively wide variation of snare timbres and tunings and so no equivalent snare-tuning principals are proposed. During the drum engineering/recording stage, it is often appropriate to make minimal use of the natural ambience and room colouration of the recording space. From a spatial perspective, most of CMM's sounds are very present, and close to the listener. Having the ability to fully control the ambient characteristics of drum recordings at the mixing stage is therefore valuable.

The qualities of depth, sonic weight, significant high frequency energy, emphasised transient attack, and minimal dynamic range, are frequent characteristics of CMM's drum sounds. Radical use of corrective and creative equalisation, as well as heavy compression can provide these qualities. Normally however, the requirement for equalisation and compression is impacted, and informed, by the use of drum samples to reinforce the acoustic sources, usually just the bass drum and snare. This tends to strengthen the coverage of frequencies, and provide the impression that the drums have been hit very hard, and consistently very hard. This is something the performance event was unlikely to have provided, particularly given the physical requirements of the frequent fast subdivisions involved. As well as providing enhanced sonic weight and transient attack to the drums in their own right, the use of drum samples can assist the drums' ability to cut through the bass, and dense rhythm guitar textures.

The extent to which the precision and frequency content of drum performances are technologically mediated in CMM is normally dictated by the quality of the performance event itself. However, with seemingly ever-escalating CMM tempi and performance complexity, many producers are increasing their reliance on technology as the principle source for drum textures and performance precision. Therefore, for the drum production element of CMM, it is often not so much a case of documenting a performance, but creating an experience in itself. These techniques frequently oblige the producer to accept a duty of performance enhancement, therefore placing the producer in a role as performer. However, tacit knowledge is essential for effectively creating this experience in a way that prevents the audience from easily distinguishing this. These techniques, approaches and processes can be viewed as specific skills that those producers working within CMM need to develop.



Bass guitar timbres will usually have a substantial influence on CMM productions' sense of heaviness. Layering techniques, sometimes involving distortion, can strengthen the coverage of frequencies to provide a heavier bass timbre. However, when these sounds present weight, size and depth in isolation, they may not function well when placed within the context of the drums and guitar. This is partly due to the numerous distinct challenges presented by the down tuning of the bass and guitar, and the way these sounds interact, often within the range of frequencies normally allocated for the bass drum. These challenges are combined with, and further embedded by, the often rhythmically concentrated patterns and dense timbre of the bass drums and guitars. These sounds frequently contest for dominance around the bass' fundamental frequency. Therefore, radical manipulation of the bass guitars' frequency content combined with strong use of compression, is normally required to suitably place the bass within the context of these textures. Strengthening frequencies to then radically attenuate, sculpt and compress these into a form that functions appropriately within the context of the production is a specific skill. It is also one that is essential for presenting appropriately the vital low-end frequency content in CMM production. Consequently, many of the bass textures in CMM production differ greatly from the natural characteristics of a direct injection and microphone combination. Invariably, it is the producer's knowledge of the appropriate techniques, approaches and processes that enables the efficacy of these bass textures, and not a natural quality that could be perceived as innate to the musician.

Despite the contribution provided by the bass guitar, CMM's defining feature of heaviness is most associated with guitar timbres. These are provided with a deeper, darker, timbre, with a lower fundamental frequency, due to the use of down tuning. Additionally, the guitars feature radical harmonic distortion. A range of production techniques is required to not only capture, and present, but also ideally enhance the sonic weight and heaviness of these sounds. To place these textures close to the listener, minimal use of the recording environment's ambience is normal. The technique of quad tracking is frequently employed, requiring four separate rhythm guitar performances. By varying the timbre between each, a denser, sonically heavier sound can be achieved. However, the emphasis and enhancement of the rhythm guitar's heaviness and density often has an adverse impact on its note definition and clarity. Furthermore, the dense and heavy rhythm guitar textures can present numerous challenges to providing appropriate sonic weight and intelligibility to the rest of the instrumentation and vocals. Therefore, appropriate influence of distortion, and tight, controlled frequencies that facilitate clarity of pitch, is essential.

Appropriate enhancement of the sonic weight and heaviness of CMM's guitar timbres, and the balance of this with the essential qualities that relate to clarity, is often a defining factor of commercial production standards. The producer's experience that is required for effectively combining and providing these qualities will often reflect tacit knowledge of how these timbres will work in the context of the sample enhanced drums and layered bass sounds.

Due to CMM's frequent focus on ensemble rhythmic complexity, the foregrounding and emphasis of its rhythmic components (often the bass drums and guitars) is normal. The production's emphasis on rhythm regularly replaces the traditional foregrounding of vocals in popular music. CMM's non-pitch based and highly distorted vocals tend to provide perceptions of loudness. These vocal textures and the emotions conveyed, are often more important than the clarity required for, and associated with, more melodic vocals. CMM vocal textures can be enhanced with tracking techniques that provide more than one simultaneous vocal performance. However, it is usual that the main vocal is presented in a way that appears not to be technologically mediated.

Many of these production methods simultaneously facilitate CMM production's defining features of heaviness and sonic weight, as well as definition and intelligibility. Other significant production approaches and methods that can assist in providing these qualities are: a high level of waveform edits to completely silence unwanted performance elements in combination with drum gating enable greater control of sources within the mix; intelligent and mirrored equalisation principles to avoid detrimental frequency accumulation; compression techniques to emphasise transients and series compression to provide strong dynamic range reduction; and the generation of harmonic content through the use of distortion to create a suitable vocal texture.

The often-radical use of these techniques, when compared to other styles of rock music containing similar instrumentation, frequently provides scope for input from the producer or mixer's perspective. However in other areas, for example those that relate to capturing and presenting appropriate spatial and depth characteristics, or the restricted influence on song arrangements and vocal harmonies, the scope for the CMM producer's input is more limited.

Much of this discourse makes evident the importance of CMM producers having a credible knowledge, and understanding of, the music and the performances themselves. Additionally these methods imply the need for a comprehensive understanding of the commonly shared sounds, timbres, and practices involved with CMM, and what is required of a production.

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At the start of this thesis, the scope and landscape for the study of CMM production was laid out, and the processes involved were divided into three stages: pre-production; engineering/recording; and mixing. We saw in item one how essential is the concept of precision and technical exactitude of performance, and the most effective pre-production and engineering approaches to enable and capture this. It demonstrated that in some instances, the perception of drum performance precision, and virtuosity, could be created, or 'built', when the actual performance events are sub-standard in this respect.

We saw in item two the approaches and techniques for enabling depth, sonic weight, and transient attack to drum shell sounds at source. Broad principles relating to the physical properties of drum shells, drumheads, re-heading, tuning, and dampening were provided. The emphasis of many of these techniques centred on providing depth to these drum timbres, as well as the ability to punch through dense rhythm guitar timbres.

In item three, the defining features of CMM production were highlighted. These are heaviness and sonic weight, which are the music's defining feature, qualities that are combined with definition and intelligibility. This is fundamental to retaining and providing the clarity of CMM performances within the context of often complex and virtuosic musical performances. Techniques to capture and present these qualities were provided. These included the layering of sounds to strengthen the coverage of frequencies, the use of drum samples and transient design, and separation techniques with equalisation. Many of these methods were presented from the perspective of engaging with the specific challenges presented by CMM's performance, timbre, and sound characteristics.

Covering all three stages of pre-production, engineering/recording, and mixing, items four and five presented a comprehensive production methodology for CMM. In

addition to an emphasis on sonic weight and overall clarity, wide-ranging principles reflecting CMM's focus on performance precision and ensemble rhythmic complexity were provided. Engineering and recording approaches to appropriately capture the relevant performance perspectives, sounds and timbres were highlighted. Furthermore, broad attention to the processing approaches and methodologies required for mixing CMM were presented. Here, the principal focus was mix techniques that enable a combination of heaviness and intelligibility, and approaches that present appropriate depth and spatial characteristics.

We saw in item six various methods for appropriately presenting the low frequencies of the mix, particularly those relating to the bass. As highlighted by professional producer Andy Sneap in the interviews for this thesis (Sneap, 2009, personal communication), this is one of the main challenges in CMM production. Discourse relating to various recording and processing techniques was provided here including: the layering of sounds to reinforce frequency coverage; the use of bass simulation software and the use of distortion; mirrored equalisation techniques to avoid frequency accumulation; multi-band, and series, compression approaches.

Items seven and eight focused on enabling novice standard producers to work towards higher production values with limited budgets. Key examples of the discussion included: basic acoustic, and reverb, principles to provide appropriate depth characteristics; sound at source considerations when recording, such as drum tuning and physical aspects related to effective down tuning; frequency dispersion techniques using equalisation to provide weight and clarity to a production; and approaches to the use of master bus compression, which are relevant to most effectively enabling the minimal dynamic range of CMM productions.

In item nine we saw further discussion of the numerous problems presented by the performance and textural qualities of CMM. This publication focused solely on intelligent equalisation principles and techniques for minimising masking. Reducing masking is fundamental to achieving separation, definition and perceived loudness in the dense mixes encountered in CMM. Key examples here included complementary, and mirrored, equalisation, as well as frequency dispersion principles.

We also saw this synoptic commentary providing context to the production methodology by identifying CMM's commonly shared performance perspectives, sounds, timbres, and practices. These include high tempi, fast and often complex

subdivisions, and highly synchronised instrumentation. This results in rhythmically concentrated drum, bass, and guitar patterns with a frequent focus of ensemble rhythmic complexity. To enable accuracy in these collective performance perspectives, metronomic style performance precision and technical exactitude is required, or recreated. The rhythm guitars are dense, highly distorted and down tuned, and commonly feature single note ostinato phrasing, often with staccato components, predominantly in the lower registers. The bass guitar in CMM is similarly down tuned, and frequently plays the same patterns and performance parts as the guitar, but an octave lower. The regular expression of low, distorted, non-pitch based and limited-range vocals influences the music's frequent lack of any explicitly melodic components. This thesis has therefore tried to show the relationship between CMM performance and the ethos of its production.

Finally, we saw this discourse offering a reflective commentary. This provided an effective way of contextualising the author's experiential learning processes, and the empirical approaches and techniques involved in relevant areas of the creation of the portfolio of productions. This portfolio represents the author's decade of CMM production work, and when amalgamated with the audio examples, and reflective commentary, demonstrated an in-depth understanding of the techniques, approaches, and technological processes involved. As well as informing the overall discourse and its vocational perspectives, the field interviews with well-known practitioners reinforce the validity of this work.

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The subjective quality of heaviness is presented to, and often perceived by, the listener as an apparently natural quality that is innate to the performance of the music. Similarly, the listener frequently perceives a sense of performance precision and advanced musicianship in the music's recorded and mixed form as being transferred into a recording through the musician's virtuosity and authenticity. Often, however, this is not the case. As this thesis has revealed, in many instances, contemporary metal music is as heavily processed, and technologically mediated, as commercial pop, or hardcore dance music regularly is. It is significant that due to the culture and aesthetics surrounding CMM, the significant role of technologies in the creation of the music is usually disguised in contrast to hardcore dance music, for example, where such technological influence is usually valued and clearly revealed.

Contemporary metal culture places particularly high value on genuine virtuosity and musicianship, and for the music to be considered 'true', or authentic, is paramount. This has resulted in a considerable level of discourse within fans of the music about what is considered to be 'real' or 'false' metal. The production techniques and processes presented and discussed in this thesis could be considered interesting to some fans, who might view these techniques and approaches as falsifying essential elements of the sound, or performance event, or alternatively presenting 'counterfeit', or inauthentic, virtuosity. These technological processes range from multiple-take layering techniques to provide exaggerated density and heaviness of guitar timbre, the use of drum samples to strengthen the coverage of frequencies and provide the impression of dynamically consistent performances, right through to the complete construction of musical elements that create an apparently natural sounding representation of a non-existent performance event.

In conclusion therefore, CMM production often presents highly technologically-mediated simulacra. This thesis has sought to explain and define the nature of these simulacra, for the interest of researchers in understanding its nature, and for the interest of practitioners in reliably manufacturing those simulacra in a way that is not easily distinguished by the audience.

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**Appendix 1**

**From Heavy Metal  
to Contemporary Metal**

## **Appendix 1.**

### **From Heavy Metal to Contemporary Metal**

Following the emergence of the metal music genre in the early 1970s, the 1980s witnessed the style's dramatic ascent in popularity and success. This continued throughout the decade with metal becoming America's foremost popular music genre (Walser, 1993, p.3); however, this period was also marked by the process of the style's fragmentation, which reached its culmination in the 1990s (Walser, 1993, p.13; Kahn-Harris, 2007, p.2). This fragmentation took the form of the style evolving, dividing and multiplying into numerous subgenres, with Friesen and Epstein observing over forty (Friesen and Epstein, 1994). These include, but are not restricted to: speed/thrash metal, doom metal, death metal, rap metal, neo-classical metal, nu-metal, black metal, hardcore metal, grindcore, industrial metal, progressive metal, post-metal, gothic metal and symphonic metal. The differences between these subgenres, although sometimes subtle, tend to revolve around song tempo, style of drumming, overall instrumentation, song structure, level of guitar and bass down tuning, rhythm and lead guitar playing style, lyrical content and vocal style (Moynihan and Søderlind, 1998; Purcell, 2003; Mudrian, 2004; Kahn-Harris, 2007).

Weinstein states that heavy metal has a distinctive sound, and that volume, distortion, melody, rhythm, bass, and vocal timbre signify the aesthetics of this sound (Weinstein, 1991, pp.23-26). However, attempting to set out the musical parameters of the genre is highly problematic (Shuker, 2005, p.132) as metal embraces a wide range of musical styles (Walser, 1993, pp.3-4). Similarly, any attempt to provide a specific scheme of classification for any of the style's multiple subgenres also presents numerous challenges. According to Berger "The stylistic differences and sub cultural divisions within metal are far more complex than those in rock" (Berger, 1999b, p.56), and Azevedo suggests that these differences and divisions are permeable (Azevedo, 2010, p.332). Weinstein even argues that the days of heavy metal being a genre are long gone, and states:

...the term "metal" refers, at most, to a "super-genre" comprehending all sorts of musical styles and hybrid genres which bear little resemblance to each other musically or in their cultural and social contexts, yet bear some connection with what has been called "metal" in the past; and is, therefore, minimally, a term designating whatever forms of music are called "metal" by anyone who wishes to do so for whatever purposes – most frequently commercial and/or journalistic. To put it in a postmodern way, there is no "essential definition" of

“metal” that could serve as a basis for investigating the object or scope of “metal studies”. Fans and opponents of subgenres and styles can, and will, argue incessantly about what is “true” and “false” metal (if they any longer care), but it would be ludicrous for scholars to enter such “debates”.  
(Weinstein, 2011, p.244)

Therefore, to avoid any possible debate about the accuracy of their application, this research will avoid the use of specific subgenre designators. Additionally, the terms ‘heavy metal’ and ‘traditional heavy metal’ (THM) will be used as separate designators. In recent years these terms (as well as derivatives such as ‘trad-metal’) have been adopted as a way of describing bands whose performance and artistic approach is similar to the style heard before the genre evolved and hybridised.

## **Appendix 2**

# **Contemporary Metal**

## Appendix 2.

### Contemporary Metal

If metal studies is to serve the function of providing forums for the enhancement of knowledge, it would do well to steer clear of definitional battles and simply be content with accepting all the various self-designations of metal, regardless of whether they originate with fans, adversaries, critics, journalists, promoters, artists or scholars.  
(Weinstein, 2011, p.244)

These sentiments from Weinstein are valuable ones, and highly relevant to this work. However, although avoiding disputes over definitions is important, the production techniques, approaches and processes focused on in this thesis are largely centred around, and appropriate to, qualities found in metal music following its evolution, fragmentation and division into numerous subgenres. For these reasons, the collective, generic term contemporary metal music (CMM) will be used for this thesis. CMM is a term sometimes used by metal studies academics, and within the metal music media, to collectively differentiate bands demonstrating performance, timbral and compositional qualities associated with the metal styles' subgenres, rather than those employed for THM. Examples of metal studies scholars who have employed the CMM term, and relevant publications illustrating this, include:

- Rafalovich and Schneider (2005) 'Song Lyrics in Contemporary Metal Music as Counter-hegemonic Discourse'
- Rafalovich (2006) 'Broken and Becoming God-Sized: Contemporary Metal Music and Masculine Individualism'
- Brown (2007) 'EVERYTHING LOUDER THAN EVERYTHING ELSE': The Contemporary Metal Music Magazine and its Cultural Appeal'
- Brown (2011) 'Heavy Genealogy: Mapping the Currents, Contraflows and Conflicts of the Emergent Field of Metal Studies', where Brown refers to a "a globalised and hybridised contemporary metal music scene", and "The exploration of contemporary metal culture as *analogous* to a religious formation" (Brown, 2011, p.232)

From a more generalised literary perspective, Andy Bennett (2001) in *Cultures of Popular Music* examines the "heavy metal phenomenon from its origins at the end of the 1960s through to the contemporary metal scene" (Bennett, 2001, p.56) and Roy Shuker (2005) uses the term contemporary heavy metal in his *Popular Music: The*

*Key Concepts* book, which presents a glossary of the main terms and concepts used in the study of popular music. Referring to the multiple subgenres that resulted from the metal styles' fragmentation and hybridisation, Shuker proposes:

There are a number of identifiable heavy metal subgenres, or closely related styles. Although these are historically specific, each has continued to be represented in the complex range of contemporary heavy metal...  
(Shuker, 2005, p.133)

This statement equates CMM with the numerous subgenres highlighted in the previous chapter.

As an example of the CMM term being used within the media, the Magazines Download website emphasises the differing nature of traditional and contemporary metal artists, describing the UK's Metal Hammer magazine as covering "both traditional and contemporary metal bands" (Magazines Download, n.d.).

Some of the earlier publications, which form part of this body of work, may use the term extreme metal; this should now be read as CMM. The following chapters will provide discussion and analysis on the performance perspectives, sounds, timbres and practices frequently shared within CMM, in part by providing comparisons and contrasts with traditional metal styles.

**Appendix 3**

**Performance Perspectives,  
Sounds, Timbres and Practices**

### **Appendix 3.**

## **Performance Perspectives, Sounds, Timbres and Practices**

The analytical perspective implemented here adopts aspects of the theoretical frameworks developed by Allan F. Moore (2001) in *Rock: The Primary Text*. Moore expresses the challenges encountered in imparting a definition of rock, stating, “we are always in the process of defining rock, and no formulation I shall offer can be considered definitive” (Moore 2001, p.4). There are numerous problems, as discussed in the previous chapter, when attempting to classify musical parameters for CMM (Walser, 1993; Shuker, 2005; Weinstein, 2011). For example, there is the possibility that oversimplifications are made through excessively broad generalisations. However, Moore’s sentiments regarding a model of style for rock music could be seen as equally valid when applied to CMM. Therefore, although there can be no unchanging and definitive description of CMM, the author similarly proposes that there are ways of expressing common musical sounds, performance perspectives and a coherent set of practices that are frequently shared.

In addition to proposing these common musical sounds, performance perspectives and coherent set of practices, the methodology implemented for the following chapters is further influenced by Allan F. Moore (2001). Moore distinguishes heavy metal from hard rock from the perspectives of: structure; tempo; guitar articulation; instrumentation and associated texture; vocals; and from numerous elements collectively referred to as ‘formal predictability’ (Moore, 2001, pp.157-151). In a comparable manner, this body of work seeks to distinguish, and provide a clear delineation between, CMM and THM, and as “points on a style continuum” (Moore, 2001, p.148).

However, providing a complete musicological analysis of contemporary metal music performance is beyond the scope of this body of work. The following provides discussion and analysis of: tempo; rhythm; sub-divisional and rhythmic complexity; drum, rhythm guitar and bass structures; phrasing and articulation; sound and timbre; as well as vocal textures. However, these are primarily presented to highlight the explicit relevance that the production methodologies have to these performance qualities. The principal aim of this section on performance is therefore to provide collective coherence to these relevant production techniques, approaches and



processes, and to place them into the context of an overarching methodological framework.

### **A3.1. Tempo**

The tempi of early THM songs tended to be “slow, even ponderous” but with a wider range used towards the end of the 70s (Weinstein, 1991, p.24). Allan F. Moore highlights that THM tempi tended to fall into one of two distinct speeds: 120, or 160, beats per minute (bpm), labelled as ‘up tempo’ or ‘frenetic’ respectively, with the potential of a fifteen percent variation in each instance (Moore, 2001, p.148).

In comparison, there has been a marked overall increase for CMM performance tempi (Russell, 2009, personal communication), with high tempi often being fundamental to CMM’s identity. Kahn-Harris notes that modern metal tempi often fall between 150-250bpm (Kahn-Harris, 2007, p.32), and in radical recent examples, tempi sometimes exceed 350bpm for quarter note values (Berry and Gianni, 2004, p.85). Furthermore, CMM performance tempi are more likely to display dramatic changes within the song than in THM (Purcell, 2003, pp.11-24), which have a tendency to be more stable. However, it is important to note that it is not perhaps tempo that matters here; so much as the way that tempo influences the perception of speed. An example of high performance tempi can be heard on ‘Bossanova Massacre’ by ChaosBlood, which is track nine of the portfolio of productions. This remains at 224bpm throughout the 1’10” duration of the song.

One of the results of these higher tempi is smaller inter-onset intervals than in the comparatively slower spacious arrangements of THM, and consequently more rhythmically concentrated drum, bass, and guitar patterns. Inter-onset intervals are “the elapsed time, measured in milliseconds, between the onset of one sound and the onset of the next” (Zagorski-Thomas, 2007, p.334). These smaller metric groupings are likely to restrict the possibilities for dynamic variation, improvisation and variation of performance. Furthermore, numerous studies have been carried out that support the hypothesis that expressive timing does not scale accordingly with tempo (Collier and Collier, 1996; Friberg and Sundstrom, 2002; Honing and Has De Baas, 2008) with these authors concluding that an increase in tempo frequently results in a decrease in the amount of swing ratio found in drum performance patterns. These findings would seem to have relevance to CMM’s high tempi drum

patterns that are frequently performed with minimal, or no, swing, groove, or expressive timing discrepancies, which are sometimes referred to as 'human-feel'. These 'straight', rather than swung, drum performance characteristics partly dictate the style's aesthetic of performance precision (Haid, 2006, p.100), which in many instances can be viewed as a central rhythmic quality native to CMM, and will be discussed further, later in this thesis.

### **A3.2 Rhythm, Subdivisions, and Ensemble Rhythmic Complexity**

Although Walser proposes that "Rhythm has been particularly neglected in Western theories of musical meaning" (Walser, 1993, p.48), it is interesting to note that he provides cursory discussion, less than two pages, to the rhythmic qualities of THM in *Running with the Devil: Power, Gender and Madness in Heavy Metal Music* (1993). The reasons for this could be, as Walser himself suggests, that the rhythmic elements of THM are often perceived as "very simple" (Walser, 1993, p.49). The resolute rudimentary drive often comprises of eighth and sixteenth notes, mostly with a 4 / 4 time signature, frequently in concise two or three note groupings. As will be explained, the author proposes that if Walser were writing this text approximately two decades later, with a focus on CMM rather than THM, then far greater analysis and consideration of rhythmic concepts would be required.

In contrast to THM's more basic pulsing structures (Walser, 1993, p.49), the rhythmic phrasing of CMM has more of a tendency to impart fluid presentation of 32<sup>nd</sup> notes at high tempi, frequently sustained over considerable periods of time, or with complex and fragmented bursts of notes (Hutcherson & Haenfler, 2010, p.113) regularly performed with staccato components. Therefore, at its most fundamental level, the identity of CMM denotes a tendency to focus on the intensity and intricacy of rhythmically concentrated drum, bass, and guitar patterns. THM, in contrast, has more dispersed inter-onset intervals and therefore more openness to the rhythmic patterns of the drums, bass and guitar, and is combined with more spacious instrumental arrangement.

An example of this intensity and intricacy of rhythmic treatment, featuring fragmented bursts of notes with staccato components, can be heard from 2'12" onwards in the track 'Of the Skies' by For Untold Reasons, which is track two of the portfolio of productions.

The method in which CMM achieves this intensity of rhythm, is frequently through fast subdivisions and sub-divisional complexity of the drum, bass and guitar performances. Subdivisions represent a process of dividing a rhythmic pattern, or pulse, into lesser components than those being counted, for example a 4 / 4 measure divided into 32<sup>nd</sup> notes. For the purposes of this work, sub-divisional complexity refers to rhythmic patterns that consist of a number of interconnecting clusters of different subdivisions, rather than consecutive repetition of continuous pulse straight subdivisions. For radical examples of fast subdivisions, and sub-divisional complexity, Swedish band Meshuggah demonstrate these conventions throughout most of their work, for example, the albums 'Chaosphere' (1998), 'Catch Thirtythree' (2005), 'ObZen' (2008) and the single song EP, divided into thirteen tracks, 'I' (2004).

For this style, when performances are based around fast, or complex subdivisions, high levels of synchronisation between the drums, guitar and bass are likely. For the purposes of this work, synchronisation is an adjective describing drumbeats and subdivisions, particularly relating to the bass drums, that are largely, or entirely, coordinated with the rhythmic patterns of the guitar and bass (Pieslak, 2008, p.13; Turner, 2009, p.6). Combined with higher tempi and increased sub-divisional complexity, one of the results of this synchronisation is a significant concentration of musical sounds within the space that the music resides, usually resulting in sonic properties that are considered dense. Due to the number of different instruments, or elements of instruments, synchronising and emphasising these subdivisions, this will usually result in rhythm structures that are dominant, forceful and clearly defined. These sonic conventions provide textures that are usually perceived as intense and distinctly aggressive (Pillsbury, 2006, p.5), particularly when performed at high tempi. An example of fast subdivisions performed with high levels of synchronisation between the drums, guitar and bass can be heard from 2'19" – 3'07" in 'Of the Skies' by For Untold Reasons, which is track two of the portfolio of productions. Here, the subdivisions and rhythmic patterns of the bass drums, bass and rhythm guitars are inseparable, or highly synchronised throughout.

However, it is important to note that certain instrumentation in CMM, most often the drums, will frequently perform different sub-divisional patterns across sections where the other instruments sub-divisional patterns remain the same. This is often perceived as providing different levels of energy throughout the song structures, and

a common technique here is a break down, or beat down, which Pillsbury refers to as:

Sections that either cut sixteenth note intensities into eighth-note intensities; or maintain a sense of continuous rhythm in the guitars but do so accompanied by a halftime drum pattern.  
(Pillsbury, 2006, p.11)

This chapter, to this point, has highlighted CMM's inclination towards the use of: high tempi; dramatic tempo changes; fast subdivisions; staccato components; increased sub-divisional complexity and high levels of synchronisation. Further to these properties, CMM has a propensity towards extensive use of syncopation. An example of syncopation in CMM can be heard from the 0'00" - 1'00" in 'Of the Skies' by For Untold Reasons, which is track two of the portfolio of productions. Here, the drum performance consists of syncopated 16th note snare patterns, followed by replicated syncopated 16th note bass drum patterns, in 4 / 4 time over a 2-bar phrase and highly synchronised with the bass and rhythm guitar.

Collectively, these sonic structures and conventions tend to exhibit an overarching complexity in the construction of the music, and give a technical nature to these performances. However, it is relevant to note here, that although CMM performances have a tendency to display a complex and technical nature, there are other forms of popular music that can often present just as, if not more, complex and technical primary performance techniques than those in CMM - examples of which would be jazz and progressive rock. In a similar manner to some of the values held by those within these music styles and scenes, the technicality of musical composition and performance complexity, sophistication and proficiency in CMM is often afforded high value and esteem by artists and enthusiasts alike (Purcell, 2003, pp.12-14), with Phillipov claiming that:

Technical complexity is often claimed as a virtue in and of itself, with fans and musicians often claiming a level of prestige for the music based on its technical difficulty.  
(Phillipov, 2012, p.64)

CM production values will often aim to convince the listener of the technical complexity of these various musical performances.

The frequently high level of synchronisation in CMM directly influences the style's ethos of performance precision and technical exactitude. This is commonly central to the identity and aesthetics of the music's performance and can be viewed as a significant stylistic marker of CMM. Precision of performance refers to the timing of drum and cymbal hits, as well as guitar and bass notes, being played very close to the intended beats, and precise fractions of beats, of the intended rhythmic sequence. To maximise the potential for accurate ensemble synchronisation, straight, metronomic performances, with minimal, or no, expressive timing variations in the performance, are frequently required. As CMM performances are predominantly based around fast and/or complex subdivisions, with high levels of accentuation or synchronisation, the concept of rhythmical perfection is a characteristic that many musicians and producers endeavor to capture and present. This results in a tight, but rarely improvisatory methodology to CMM performance.

For many of the reasons discussed in this chapter so far, and particularly the higher synchronous relationship between the bass drum and rhythm and bass guitar's subdivisions and patterns, the transition from THM to CMM can be considered a repositioning that is focused on, and more concerned with, ensemble rhythmic complexity. This can be viewed as a move away from platforms of "heroic individualism" (Millard, 2004, p.169), which for THM is often characterised by individualised solo virtuosity (Waksman, 2001, p.131). With reference to THM and CMM being "points on a style continuum" (Moore, 2001, p.148), in many instances, this conversion from individual melodic virtuosity to ensemble rhythmic complexity can be viewed as a paradigm shift in the sonic conventions and performance properties distinguishing the aesthetics of these styles. Additionally, the focus on rhythm, rather than vocals or melody (Friesen and Epstein, 1994, p.4), contributes to the fundamental lack of any explicitly melodic components in a lot of CMM. Due to this focus on ensemble rhythmic complexity, the music's main rhythmical components, often the bass drums and guitars are usually foregrounded in the mix, and therefore emphasised by the production approach.

Common rhythmic perspectives of CMM drums, bass and guitar performance will now be provided. Before doing so however, it is important to note that although CM has a tendency to feature greatly increased sub-divisional complexity, this is not a pre-requisite for music to be considered CMM. As Pieslak highlights:

Fan identification within metal appears to be shaped at its most rudimentary

and 'popular' level around the music, but in two differing aspects – sound/timbre or performance/note complexity. (Pieslak, 2008, p.46)

The author agrees with Pieslak in this respect, and, for example, the radical contrast between the performance and note complexity in track two, track eight, track nine and track eighteen on the portfolio of productions can be contrasted with the far higher focus on sound and timbre in track one, track five, track eleven and track thirteen. Therefore, following sections on CMM drums, guitar, bass and performance, which provide considerable attention to performance/note complexity, a section discussing sound/timbre will be presented.

### **A3.3 Drums**

Haid highlights that metal drumming requires “stamina, athleticism, speed and agility” to achieve its core traits of “precision and speed” (Haid, 2006, p.96) Similarly, Berry and Gianni note that an “exceptional amount of endurance” is required to develop the considerable coordination, and dexterity to play the “exceptionally fast, technically challenging rhythms...most notably double bass drum patterns inherent to this style” (Berry and Gianni, 2004, p.85). Many of the CMM performance traits presented in the previous chapter result in physically concentrated drum patterns that require a higher level of technical proficiency, precision and exactitude from the performer.

This physical element to CMM drumming also correlates with the concept of power that is essential to its production values, and it can be noted that many of the relevant drum production techniques have a central focus of providing the impression that the drums are hit hard, and consistently hit hard.

#### **A3.3.1 Blast Beats**

A CMM drum performance technique, mostly used in more extreme styles, that very much represents this more physical style of drumming is the blast beat. The blast beat is a drumming technique whereby exceptionally fast, straight and metronomic, snare hits are performed. Similar to many drumbeats, this is most usually carried out with one hand executing the snare hits, however these snare hits are “exceedingly fast to the point of losing completely their traditional backbeat

function” (Pillsbury, 2006, p.202). Kahn-Harris suggests that these are performed above 300bpm (Kahn-Harris, 2006, p.32), with Phillipov proposing that blast beats are generally performed as 8<sup>th</sup> notes (Phillipov, 2012, p.86). Phillipov goes on to outline a number of different styles of blast beat: “Simultaneous eighth notes on the ride cymbal and kick drum, plus alternate eighth notes on the snare” or varying this approach with “a one-handed roll technique that uses the snare’s rim to create what sounds like a two-handed drum roll”; with the snare, bass drum and hi-hat or ride, being hit in unison; or “playing a sixteenth note double-kick roll while hitting eighth notes on the snare” (Phillipov, 2012, p.86). 0’03” – 0’17” of the track “Bossanova Massacre” by ChaosBlood, track nine on the portfolio of productions, demonstrates this last instance of blast beat.

### **A3.3.2 Double Bass Drums**

Double bass drums have been of importance to heavy metal music styles in general, with Berry and Gianni noting that, “double bass playing is a strong characteristic of heavy metal” (Berry and Gianni, 2004, p.86). However, due to the focus on high tempi and fast subdivisions, CMM’s double bass drum performances are often highly physically concentrated.

The term double bass drums refers to a single bass drum, or two separate bass drums, performed in each instance with two separate beaters controlled by each of the drummer’s feet. For a single bass drum, a double pedal is required, which enables two separate pedals operating two separate beaters to be connected to a single bass drum. Rondinelli and Lauren state:

Double pedals give you a more even articulation, attack and sound. Two bass drums give you a wider, broader sound. Using two bass drums of the same size, but tuned differently, or two different-size bass drums, can give you a variety of pitches to work with.  
(Rondinelli and Lauren, 2000, p.5)

These sentiments highlight the sonic characteristics of a single bass drum performed with a double pedal, compared to two bass drums performed with two separate pedals. However, from a music production perspective, the perception of these differences can be highly impacted by the use of bass drum sample augmentation, or replacement, and the specific techniques and approaches employed to achieve this.

For CMM music, the previously discussed increase of tempi and sub-divisional complexity will usually result in fast, and complex, double bass drum performances. The term 'fast double bass drums' refers to high-speed bass drum subdivisions, requiring a high level of dexterity and coordination usually with a requirement of minimal, or no, dynamic variation. These high-speed bass drum subdivisions are often continued over considerable time periods, thereby requiring elevated levels of coordination, stamina, dexterity, control and strength (Berry and Gianni, 2004, p.86). The term complex double bass drums refers to double bass drum performances demonstrating complicated rhythm structures and timing complexities that consist of a number of interconnecting clusters of different subdivisions, rather than consecutive repetition of continuous pulse straight subdivisions. Referring to both fast and complex bass drum performances, and their importance to CMM, Rooney states:

These often feature 32<sup>nd</sup> notes at extreme tempi, and complex and fragmented bass drum figures in 16<sup>th</sup> and 32<sup>nd</sup> note denominations. In no other form of music is the bass drum linked so closely and definitively with rhythmically complex subdivisions, indeed this relationship often underpins entire albums by certain bands.

(Rooney, 2012, personal communication).

As part of the complex and fragmented bass drum figures referred to by Rooney, accomplished double bass drummers can play anything from "polyrhythms to syncopated rhythms to rudimental style drumming with their feet (e.g. double stroke rolls, flamed rudiments etc.)" (Berry and Gianni, 2004, p.86). Berry and Gianni's reference to drum polyrhythms here has significance to CMM, as these are often utilised to provide syncopation. Sometimes referred to as cross-rhythms, the term polyrhythm refers to the simultaneous performance of two or more contrasting rhythmic pulses, normally played on differing drums, or differing elements within the drum set, which in CM will usually involve double bass, drum patterns. Krebs proposes these multiple rhythms to be "interpretative layers whose cardinalities are different and are not multiples/factors of each other" (Krebs, 1999, p.31).

Due to high tempi, the sub-divisional complexity of the drum and bass drum performances, and the frequently symbiotic relationship between the bass drum and rhythm and bass guitar patterns, CMM double bass drums are likely to play a vital role. For these reasons, the bass drums are "seemingly of higher importance to establishing a groove than the snares and cymbals" (Turner, 2012, p.36).



Furthermore, due to bass drums suggesting intensity (Pieslak, 2008, p. 13), it can be proposed that the smaller inter-onset intervals of CMM bass drums, resulting from fast sub-divisions, will usually result in the music being sonically intense.

The importance of the role of the bass drums in CMM is often reflected in the music's production values, whereby this element is frequently foregrounded in the mix. Supporting this notion, Turner makes an association between the production approaches of contemporary dance music and contemporary metal, stating the requirement of the bass drum's prominence in the mix for both music styles (Turner, 2012, pp.38-39).

### **A3.3.3 Phrasing**

The discussion has highlighted CMM drum performances inclination toward fast subdivisions, high levels of sub-divisional complexity and the tendency for the drum patterns to synchronise with the bass and rhythm guitar's rhythmic patterns. However, there are numerous other sonic conventions that distinguish drum performances in CMM, notably in the phrasing and cymbal work. These performance techniques emphasise a focus on sound/timbre, rather performance/note complexity (Pieslak, 2008, p.46).

The author carried out a number of field interviews into various aspects of CMM drumming with Steve Rooney, who is a columnist for *Drummer* magazine, and artist/columnist for *Rhythm* magazine. As a live and recording session musician performing in the UK, European, Scandinavian and LA metal scene for over twenty-five years, Rooney has also conducted classes and seminars on metal drumming at London's Drumtech institute. Rooney highlighted linear phrasing, Afro-Cuban clave style phrasing, advanced phrasing between the shells and cymbals, and previously unused cymbal phrasings as performance techniques often used in CMM drum styles (Rooney, 2012, personal communication). Rooney's observations and explanations concerning the relevance of linear phrasing merit presenting in full:

Linear phrases by definition are drum phrases composed of sound sources 'one after another', as opposed to several sound sources played simultaneously. For example, a straight 4/4-rock beat could be typically composed of 8th notes played on hi hats or similar, snare and bass drum, played in a three-way combination simultaneously. A linear take on this would be performed mainly one sound source after another, i.e. kick, hats, snare, kick, hats, snare, no two limbs playing strokes simultaneously. These phrases are in no way particular to any subdivision and are not strict in terms of the linear

principal, often being used in conjunction with traditional three or four way coordinated patterns.  
(Rooney, 2012, personal communication)

Rooney emphasises Gene Hoglan's groundbreaking example of linear phrasing on the album 'Symbolic' by the band Death. Although he highlights this album as representing the first time he had heard linear phrasing used in a metal context, with expressive phrasing between the hi-hats, tom-toms, splash cymbals, and bells of cymbals, Rooney remarks that in terms of CMM performance, the concept of linear phrasing is now so commonplace as to be almost unremarkable (Rooney, 2012, personal communication).

An example of phrasing that has influenced the grooves used in CMM is Afro-Cuban clave style phrasing. Rooney argues that, due to the widespread influence of Afro-Cuban rhythms on many areas of popular music, it is natural that these would find their way into heavy music styles.

The principle of Afro-Cuban rhythms with regard to their application on the drum set, is the repeated use of 'clave' or 'key', a simple rhythmic motif which features constantly in the pattern, for example the rumba clave and the son clave.  
(Rooney, 2012, personal communication)

Here, Rooney highlights the most obvious example of Afro-Cuban clave style phrasing influencing metal as Sepultura's (1996) album 'Roots'. The impact of Sepultura, and this album, on a global level are focused on in Kahn-Harris (2000) *'Roots'?: The Relationship Between the Global and the Local within the Extreme Metal Scene*. Rooney notes that the album's title track is informed by a 3/2-rumba clave, and rhythms considered being Afro-Cuban or Brazilian, influence the album as a whole. Similarly, Kahn-Harris notes that Igor Cavalera's drumming "relies on the toms as much as bass, snare and hi-hat" (Kahn-Harris, 2000, p.131). The album's widespread commercial success (Kahn-Harris, 2000, p.131) had a considerable impact on the drum beats and phrases used in metal from the late 1990's onwards, with Afro-Cuban and Latin informed rhythms regularly being adopted by artists such as Ill Nino and Pantera (Rooney, 2012, personal communication). Furthermore, Berry and Gianni propose, "The most advanced heavy metal grooves can also incorporate ideas from Fusion and Linear Funk" (Berry and Gianni, 2004, p.85). Fusion drum styles incorporate rock, progressive rock, jazz and funk, "and involves advanced musicianship", while linear funk "tends to be quite busy, usually featuring 16<sup>th</sup> notes throughout an entire measure" (Berry and Gianni, 2004, p.77). These techniques

denote a higher likelihood that CMM drumming will present advanced performance rudiments, denoting a greater probability of more formal and learned drum musicianship.

Previously unused cymbal phrasings, and advanced phrasing between the shells and cymbals, are performance techniques frequently used in CMM. Rooney discusses the way that CMM drummers have expanded both their cymbal set-ups and their use, noting that cymbals and cymbal effects that were previously the favourites of jazz, fusion and progressive drummers are now essential elements for many CMM drummers. These cymbal and cymbal effects include: oversize ride cymbal bell sounds (e.g. mega-bells, ice bells and Zildjian zil bells); dry, rasping, industrial china cymbal sounds and variations on these; smaller, trashy china cymbals rather than the larger more traditional versions; and perhaps most importantly, small and exotic splashes and mini-chinas (Rooney, 2012, personal communication).

These sound sources affected metal drummers phrasing by becoming increasingly utilised within the bar as left field percussive sounds, rather than the more straightforward end or beginning of the bar purely to punctuate. I must stress, this is not particular to metal, as jazz, fusion, progressive and funk players had been phrasing in these places for years. Rather, what changed for the metal drummers was the bleeding of these percussive techniques into 'heavy' phrasing such as double bass drums and dense tom-tom patterns. A modern metal drummer playing two sixteenth notes on a tiny splash cymbal in the middle of a tom-tom fill is now common and the 'surprise' element of these sounds cannot be overstated, however back in the mid 90's it was extremely fresh.

(Rooney, 2012, personal communication)

Drummers such as the aforementioned Gene Hoglan and Igor Cavalera, as well as Nicholas Barker (e.g. Dimmu Borgir's 2001 album 'Puritanical Euphoric Misanthropy') and Joey Jordison throughout Slipknot's four studio albums have popularised this more lavish style of cymbal phrasing to varying degrees. Additionally, more abundant use of cymbal hits and faster hi-hat, ride and cymbal subdivisions contribute to high levels of drum performance energy.

### **A3.4 Rhythm Guitar**

Pieslak proposes that fan identification in CMM appears to be shaped by performance/note complexity or sound/timbre (Pieslak, 2008, p.46). These separate emphases are similarly often reflected in the performance focus of different CMM

artists. However, it is important to note these categories are not mutually exclusive, as CMM artists will frequently move on a line between the points of performance/note complexity and sound/timbre, often within the same song. For example, 'Bleed on the Inside' by God-sized, Track 7 of the portfolio of productions, features an intro section from 0'19" – 0'36" that features fast double bass drums, largely synchronised with the fast note subdivisions of the bass and rhythm guitar. This section is directly followed from 0'37" – 0'55" with a syncopated and synchronised drumbeat and riff, but with slower subdivisions. However, this song's verse contains a very straight 4 / 4 drumbeat. This points to the heavily contrasting performance properties that are often displayed within CMM. Furthermore, 'Bleed on the Inside' can be contrasted with the other songs by God-sized on the portfolio of productions, namely, 'Walking Away' and 'Fight and Survive', which although featuring synchronisation between the drums, bass and guitars, don't feature fast bass drums or fast subdivisions. Similarly, although the majority of 'Time and Tide' by Kaizen, track eight of the portfolio of productions, features fast 16<sup>th</sup> bass drum subdivisions, the outro of the song, from 3'44" onwards features these qualities being interspersed sections not featuring double bass and therefore minimal synchronisation, and consequently far less rhythmically concentrated drum, bass, and guitar patterns in these sections. Again, this points to the heavily contrasting performance properties that are often displayed within CMM.

The way CMM's rhythm guitar performances relate to the qualities of performance/note complexity and sound/timbre will now be discussed.

CMM rhythm guitar performances typically have fast and complex subdivisions. The rhythmically concentrated patterns result in small inter-onset intervals that provide a high level of transients due to the fast picking motion of the performances.

Kahn-Harris emphasises the fast subdivisions frequently found in the rhythm guitar performances of CMM by noting that some riffs (short repeated rhythm phrases) are played at 500-600 notes per minute (Kahn-Harris, 2007, p.33). Fast subdivisions such as these frequently involve the guitarist exploiting "the rhythmic potential of repeated pitches" (Pillsbury, 2006, p.129). Recurring rhythmic phrases, or motifs, repeated at the same pitch is sometimes referred to as ostinato. Playing the same single pitch, rather than different pitches, enables faster subdivisions, which in CMM are regularly played in the guitar's lower registers. These repeated low notes are a generic identifier of metal (Pillsbury, 2006, p.197) that produce a "stable

affective base” (Pillsbury, 2006, p.11). Furthermore, playing these fast subdivisions with the same single pitch, rather than a chord, provides a clearer and more prominent identification of a low root tone. Pieslak proposes, “In this lower register...the fifth of the power chord tends to obscure rather than reinforce the fundamental or root in more active passages” (Pieslak, 2007, p.220). Pieslak’s comments particularly relate to rhythm guitar performances that are down tuned, a subject that will be discussed in the next chapter.

In CMM, the repetition of single pitch rhythmic patterns in the guitar’s lower registers, often centres on the use of the guitar’s lowest open string, which refers to the lowest pitch on the guitar’s register. Low pitch can be seen as vital to the overall sonic impact of CMM, due to its deep and dark timbre. Additionally, the lowest open string provides an enhanced level of mobility for the guitarist’s fretting hand, and therefore features highly in CM’s riffs, and key selection. An example of single pitch ostinato phrasing using the guitar’s open lowest string can be heard from 1’01” – 1’15” in the track ‘Of the Skies’ by For Untold Reasons, which is track two of the portfolio of productions. The 8-bar sequence features the down tuned bass and rhythm guitars playing fragmented 16<sup>th</sup> notes with staccato components at a single pitch throughout.

Furthermore, CMM riffs frequently use the lowest open string as the pitch from which other notes, or chords, alternate, often in the form of pedal points. A pedal point is a note, typically in the bass range, around which different notes, or a note, are played in another register. In CMM, these low pedal notes are often played with small staccato, complex and fragmented metric groupings, and performed with palm muting, (discussed later). An example of a pedal point performed on the open thickest string of the guitar, performed with palm muting, but played legato is 0’06” – 0’33” of ‘The Universe in a Nutshell’ by Kill 2 This, track fifteen of the portfolio of productions.

Alternatively, single pitches are repeated in very quick succession at a fixed pulse, and played smoothly without any breaks between the notes, referred to as legato. This technique is often referred to as tremolo picking. When performed without, or with minimal, application of palm muting but with an inclination towards using the guitar’s mid, rather than lower, range of notes, tremolo picking is a heavily used rhythm guitar technique of the black metal subgenre. An example of tremolo picking can be heard between 1’15” – 1’43” of the track ‘Of the Skies’ by For Untold Reasons, which is Track 2 of the portfolio of productions. This 16-bar sequence demonstrates

the bass and both rhythm guitars playing continuous pulse, legato 16<sup>th</sup> single notes, with each of these subdivisions synchronised by the bass drums.

CMM's rhythm guitar performance of highly concentrated patterns with minimal, or no, swing, groove, or expressive timing discrepancies, and highly synchronised with the drums and bass, marks a paradigm shift toward a form of rhythmic guitar virtuosity that makes the same sound more than once very fast. This is a change from Walser's ideas of individualised guitar virtuosity in THM, which, while also based on fast notes, is focused on different notes, performed melodically.

Walser states that guitar solos are "virtually required by the conventions of the genre" (Walser, 1993, p.54) which "features at least one guitar solo" in almost every song (Walser, 1993, p.50). However, CMM regularly presents songs without guitar solos, and those that do are less likely to feature highly developed or extensive solos (Millard, 2004, p.169) with emotive, soaring and melodic qualities. This is due to the tendency for the backing element(s) of CMM guitar solo sections to be focused on intensity of rhythm, rather than harmonically liberating note, or chord, sequences.

Although CMM rhythm guitar performance has an inclination toward single pitch rhythmic patterns, it also has a tendency towards the use of diads and triads, rather than full chords of four to six notes. This is due to diads and triads, two and three note chords respectively, retaining more clarity and definition than full chords, when performed with the high levels of distortion that is characteristic of this rhythm guitar style. In addition to using root and fifth, or root and fourth intervals known as power chords, these diads and triads are frequently major or minor third, diminished fifth, or minor sixth intervals. When played as part of a pedal point riff, these diads and triads are often played without being palm muted.

In combination with high tempi and fast, often staccato, ostinato, and complex, subdivisions, palm muting frequently signifies CMM's rhythmic treatment of guitar performances. Palm muting is a playing technique whereby the outer side of the palm of a guitarist's picking hand is placed across the area where the strings go onto the bridge of the guitar. This creates a more percussive, staccato, effect than otherwise, by shortening the sustain time. This emphasises the transient envelope of the note, or chord, consequently enhancing the performance's rhythmic characteristics. Due to the sonic modification benefits that palm muting provides to a

guitar's rhythmic characteristics, it has become an essential playing technique in CM. Pillsbury proposes:

By greatly emphasising both the lower frequencies and the very high overtones of the sound envelope, as well as cutting out the mid-range, palm muting results in a distortion timbre that generally sounds tighter and more precise. Furthermore, palm muting produces a distinctively percussive timbral variation. (Pillsbury, 2006, p.11)

Furthermore Phillipov points to palm muting contributing to a “distinctly percussive distortion timbre” (Phillipov, 2012, p.82), which Pillsbury suggests is a generic identifier and rhetorical device (Pillsbury, 2006, p.xxv). CMM guitar riffs will frequently accentuate the rhythmic characteristics of a guitar riff by alternating between heavily palm muted single pitch rhythmic patterns in the guitar's lower registers, and non-palm-muted notes, or chords, played elsewhere on the fretboard.

CMM frequently displays a tendency towards atonality and dissonance (the lack of fixed scale intervals or note harmony respectively) frequently through the use of chromatic progressions (Phillipov, 2012, p.xv), and the use of the flattened second interval, often resulting in the perception that the music lacks a key signature.

These qualities tend to point towards “The pivotal influence of black musics (particularly the blues) on the development of metal has progressively been erased” (Kahn-Harris, 2007, p.137). Blues, and blues-rock, aesthetics frequently provided a great deal of inspiration for THM. However it can be noted that in CMM, the use of blues based intervals as utilised by, for example, Jimi Hendrix, and blues elements in general, are usually avoided, particularly with vocals. This results in less pentatonicism in the riffs, and less use of double-stopped (two notes played simultaneously) thirds and fourths played in the mid and upper registers of the guitar. This consequently tends to result in higher degrees of segregation between the sections of rhythm and lead guitar in CMM.

In addition to the diminished impact of blues music, folk influences are rarely encountered in CMM. In contrast, classical, and particularly baroque influences regularly continue to be appropriated, assimilated and adapted. Here, classical “refers to the musical tradition of Mozart and Beethoven, of Tchaikovsky, Stravinsky and Stockhausen” (Moore, 2001, p.9). The baroque music era from 1600-1750 is often considered as representing a move away from the harshness of medieval and

early renaissance music, and tends to be characterised by the rich counterpoint and distinct melodic lines of Johann Sebastian Bach, George Frideric Handel and Antonio Vivaldi. 1'15" – 1'43", and 3'07" and 3'14" of the track 'Of the Skies' by For Untold Reasons demonstrates the continued influence of baroque, with melodic lines that are consistent with baroque music.

### **A3.5 Sound/Timbre**

Some of the different approaches to performance/note complexity can be represented by the tendencies of the bands within the portfolio of productions. Godsized and City of God are more focused towards sound/timbre, and For Untold Reasons, ChaosBlood and Evocation are more focused towards performance/note complexity. However, in both instances the bands can be seen as pursuing heavy guitar and bass timbres, frequently in a very similar manner.

In CMM, the pursuit of heavier guitar and bass timbres is normally facilitated by the now widespread use of scordatura, which refers, in this instance, to the open strings of the guitar, and bass, being provided with an alternative tuning. This normally takes the form of down tuning, which is a term used to describe a musical instrument being deliberately tuned with a lowered system of pitches. Pitch can be seen as vital to the overall sonic impact of metal and down tuning provides a deeper, heavier and darker timbre. This alters the playing experience of the instrument, due to the resulting difference in the tension of the strings, and will usually necessitate the re-intonation of the guitar. Additionally, tuning down a standard gauge string can result in poor sound, because the string will be at a much lower tension than intended, and therefore heavier string gauges are required when down tuning (Kahn-Harris, 2007, p.32). However, performing with down tuned guitars can present numerous challenges, which the player's performance technique will need to compensate for. Despite the use of heavier strings, the radically different string tension will normally result in a wider oscillation of the string, particularly on the thicker strings where most of the rhythm guitar parts will be played. This makes it notably harder to retain tuning and intonation during performance, particularly when considering the aggressive picking nature of the style.

Although there are exceptions, for example the black metal subgenre (Kahn-Harris, 2007, p.32), regular pitch tuning, which is normally referred to as A440, is



more associated with THM. In contrast, down tuning is often considered to be a prerequisite for the overall sonic impact of CMM. The thickest string features heavily in the rhythm guitar and bass performances, and the most common of these down tunings involve this string being tuned to a 'C' or 'B'. This is four or five semi tones, respectively, lower than this string would normally be pitched for A440 tuning. The rest of the strings are then lowered by the same degree, thereby retaining the usual intervals between the strings, or lowered by a tone less than the interval that the thickest string was lowered. This provides a root/fifth/octave power chord on the three thickest strings when played unfretted or on the same fret, which on the guitar can relatively easily be achieved with a single finger. This presents a new, highly mobile, context for power chords that tend to feature heavily in the rhythm guitar performances for CMM. Examples of down tuning to 'C' with a root/fifth/octave interval on the three thickest strings are 'Walking Away', 'Fight and Survive' and 'Bleed on the Inside' by God-sized, which are track one, track five and track seven of the portfolio of productions. An example of 'B' standard tuning, which retains the usual intervals between the strings is 'Requiem' by City of God, track eleven of the portfolio of productions.

As already stated, down tuning in this manner provides a deeper, darker and heavier sound, with a greater movement of air from loudspeakers reproducing the amplified sound, due to the lower fundamental frequency. Brian Moore describes the fundamental frequency as having "the lowest frequency of any of the components in the complex tone and it may be said to form the foundation for the other components" (Moore, 2003, p.4). Additionally, Moylan states that the fundamental frequency is often the most prominent in the spectrum, "and will often have the greatest amplitude of any component in the spectrum" (Moylan, 2007, p.7). When guitars and bass are down tuned to C, the fundamental frequency for the guitar is 65.407Hz and 32.703Hz for bass (Katz, 2002). When guitars and bass are down tuned to B, the fundamental frequency for the guitar is 61.735Hz and 30.868Hz for bass (Katz, 2002). These extended low frequencies provide numerous challenges when capturing, and presenting these timbres.

Further to the impact of down tuning, there has additionally been a marked increase in the heaviness of timbres involved with CMM. Berger and Fales state "Heaviness is the defining feature of the genre" (Berger and Fales, 1997, p.181) and Berger proposes, "The history of metal is commonly understood as the pursuit of greater and greater heaviness" (Berger, 1999b, p.59).

Although the subjective term 'heaviness' can refer to "a wide range of instrumental timbres and compositional elements" (Berger and Fales, 1997, p187), it is most frequently used to describe the sonic weight and density of the low and low-mid frequencies. It is also used to describe the sonic power of electric guitars when projected via tonal modification and appropriate amplification (Walser, 1993, p.2; Berger, 1999b, p.58; Weinstein, 1991, p.23). One essential ingredient of this is the deliberate introduction of distortion. Moylan proposes that "Distortion sounds and other processing effects may also provide additional spectral information and added density to the primary pitch area" (Moylan 2007, p.226). This emphasises the connection between distortion and rhythm guitar heaviness/density.

Berger and Fales argue that the characteristic guitar timbres of each new wave have had a tendency towards becoming heavier and heavier over time (Berger and Fales, 1997, p.182) and for metal guitarists, the history of guitar technology has seen a progression towards ever-heavier tones (Berger, 1999b, p.58). This progression is often by way of developments in high-gain, valve guitar amplification technology. Valve amplifiers are the most common form of amps used for metal music, as "Tubes tend to have a more musical, even order harmonic aspect to their clipping distortion" (Huber and Runstein, 1997, p 313). With characteristics better suited to down tuning, these new breed of amplifiers have provided the ability for musicians and producers to achieve significantly heavier and denser rhythm guitar timbres whilst still retaining the vital quality of note definition. Providing a concise description of note definition is challenging, due to this largely relating to timbre, which "presents specific difficulties that soon challenge the capabilities of the written word" (Hugill, 2008, p.175). However note definition, in relation to overdriven rhythm guitar sounds, can be considered as the clarity and definition of pitch, in the form of notes and chords, and the intelligibility, and ability, to detect this pitch when the guitar sound is placed in the context of a mix. Note definition reflects strong qualities in the guitar's sound envelope characteristics, an appropriateness of spectral content, particularly in the low frequencies around the fundamental, the minimal bearing of unmusical resonant frequencies, and the appropriateness of influence that distortion has on spectral content and dynamic range.

### **A3.6 Bass**

Due to the focus on ensemble rhythmic complexity in CMM, the bass often simply ‘doubles’ the guitar riffs (effectively playing the same performance part, but an octave lower). Consequently, CMM bass performance often employs the same subdivisions and performance techniques as the rhythm guitar, but normally with a greatly diminished application of palm muting. Alternatively, simpler subdivisions are often employed, resulting in notes that are sustained across the guitar’s rhythmic patterns. For these reasons, some CMM bands have a tendency to look at the bass as mainly an instrument that renders the guitar riffs with a greater level of heaviness.

These bass performance traits in CMM are often different from those in THM. This is frequently due to the slower tempi and more pulsing rhythms of THM, with a reduced focus on accentuation and synchronisation. These qualities tend to afford bass performances in THM with more musical space for rhythmic and melodic movement.

Due to the nature of down tuning in CMM, the region of frequencies and sonic space conventionally provided to the bass in music production is frequently impacted to a considerable degree by the frequency content of the rhythm guitars. Whereas the fundamental of the guitar’s lowest string when tuned to E is 82.407Hz, the most common CMM down tuning involves the lowest string being tuned to a C or B, which result in a fundamental frequency of 65.407Hz and 61.735Hz (Katz, 2002) respectively. These significantly lower fundamental frequencies of the rhythm guitar reside in an area normally allocated to the bass. This provides a particular challenge in providing separation and definition to the bass in CMM.

### **A3.7 Vocals**

Vocal performance in THM has always required a clear and often overt presentation of emotionality, usually through tone of voice, as a display of authenticity (Weinstein, 1991, pp.26-27). In contrast to THM, CMM vocal performance could be perceived as displaying confrontational hostility with aggression often involved in the delivery. Phillipov notes the “progressive elimination of recognizable signifiers of vocal melody and clarity” as metal has evolved (Phillipov, 2012, p.76). Berry and Gianni propose “The heavy metal sound initially relied on

high-pitched singers, but has since evolved to embrace lower-range roaring vocals” (Berry and Gianni, 2004, p.85), which avoid the use of sustain and vibrato (Kahn-Harris, 2007, p.32). Furthermore these performances rarely feature vocal harmonies, or significant variations in the strength or timbre of the voice, and are often so guttural as to fail to present any distinguishable note or pitch (Berger, 1999a, p.164). An example of these guttural vocals can be heard throughout ‘Of the Skies’ by For Untold Reasons. This is track two of the portfolio of productions, with the vocals commencing from 2’33” onwards. However, higher pitched vocals often feature in CMM generally (e.g. 4’37” – 4’45” in ‘Of the Skies’), and are a regular vocal characteristic of the black metal subgenre.

Walser points to THM’s operatic style with “long sustained notes” as suggesting “intensity and power” (Walser, 1993, p.45). However, in CMM, this intensity and power can be provided by even higher perceptions of volume, which overdriving the vocals through shouting, or screaming, provides. This results in greater levels of vocal distortion and is likely to be associated with aggression. Phillipov highlights that CMM often rejects “the melodic foregrounding of the singing voice that is crucial to emotional identification in popular music” (Phillipov, 2012, p.126), which Hodgson suggests, also reinforces the perceptions of loudness conveyed by these productions (Hodgson, 2010, p.181).

Although this section has noted the evolving vocal styles from THM to CMM, less melodic vocal characteristics are not a pre-requisite for music to be considered CMM. Furthermore; it is frequently the case that bands that employ guttural, non-pitch based vocal styles will also use clean vocal melodies. This will often be within the same song, and sometimes within the same line. An example can be heard in ‘Requiem’ by City of God from 1’57” – 2’40”, which is track eleven of the portfolio of productions. Here, a low, clean vocal melody, concluding with a sustained note, containing vibrato can be heard. This proceeds into a low, guttural and highly distorted vocal section, interspersed with a high pitch scream. The following vocal section returns to a low, clean vocal melody with vibrato.

### **A3.8 Contemporary Metal - Summary**

There are numerous difficulties when attempting to classify musical parameters for this style of music (Walser, 1993; Shuker, 2005; Weinstein, 2011). However to

summarise, the performance perspectives, sounds, timbres and practices that are commonly shared within CMM are:

- High tempi and dramatic tempo changes
- Fast subdivisions and sub-divisional complexity of the drums, bass and rhythm guitars, often with a requirement of minimal dynamic variation
- Small inter onset intervals, resulting in rhythmically concentrated drum, bass, and guitar patterns
- A focus on synchronisation between the drums, guitar and bass resulting in a significant concentration of musical sounds within the space that the music resides
- An overarching aesthetic of performance precision, frequently resulting in metronomic style performances, reflecting minimal, or no, swing, groove, or expressive timing discrepancies.
- Linear, linear funk, fusion and Afro-Cuban clave style drum phrasing, as well as advanced phrasing between the shells and cymbals
- An overall focus on ensemble rhythmic complexity
- The use of syncopation, staccato components, and small metric groupings
- Highly distorted, and harmonically dense rhythm guitar sounds
- The use of down tuning
- High speed down, and alternate, picking, and palm muting
- The bass and rhythm guitar's use of single note ostinato phrasing with fast subdivisions, predominantly in these instruments lower registers
- The use of diads, and triads, that are based on major or minor third, diminished fifth, or minor sixth intervals, as well as chromatic progressions, atonality and dissonance and the use of the flattened second interval
- Key selection and pedal points that favour the guitar's open sixth, or thickest, string
- The foregrounding of the music's main rhythmical components, often the bass drums and guitars
- The avoidance of blues, and blues-rock, aesthetics and the appropriation of classical and baroque influences
- Deep, guttural, distorted vocal sounds which avoid the use of sustain and vibrato, rarely feature significant variations in strength or timbre, and often fail to present any distinguishable note or pitch

CMM artists will often explore different dynamics, styles and expressions within one song (Hoffstaf and Nagenborg, 2010, p.41) and not all CMM will demonstrate all of these features. However, it is unlikely that certain music would be considered CMM without demonstrating at least some of these features. These commonly shared performance perspectives, sounds and timbres, need to be suitably captured, presented, and, ideally, enhanced through the use of appropriate production methods. These approaches, processes and techniques are presented in the publications for this thesis.

## **Appendix 4**

**Table outlining the stages of production that the publications focus on**

## Appendix 4

**Table outlining the stages of production that the publications focus on**

Item Number	Title of Publication	Production stages that the publications focus on		
		Pre - Production	Engineering / Recording	Mixing
-	-			
Item 1	The use of click tracks for drum production within the Extreme Metal genre	✓	✓	
Item 2	Sound at Source: The creative practice of re-heading, dampening and drum tuning for the contemporary metal genre	✓	✓	
Item 3	Achieving Intelligibility Whilst Maintaining Heaviness When Producing Contemporary Metal Music		✓	✓
Item 4	The Sound on Sound Guide to Recording and Producing Modern Metal	✓	✓	
Item 5	Mixing Metal - The Sound on Sound Guide to Extreme Metal Production			✓
Item 6	Get the Perfect Bass		✓	✓
Item 7	The Sound and the Fury – The Ultimate Guide to Recording Hard Rock and Extreme Metal	✓	✓	
Item 8	The Sound and the Fury. Part 2		✓	✓
Item 9	Intelligent Equalisation Principles and Techniques for Minimising Masking when Mixing the Extreme Modern Metal Genre			✓



## **Appendix 5**

### **The Portfolio of Productions**

## **Appendix 5**

### **Portfolio of Productions**

#### CD 1

##### Track Listing

1. God-sized – ‘Walking Away’
2. For Untold Reasons – ‘Of the Skies’
3. NG26 – ‘Bring Back the Day’
4. Nothing Gained – ‘Better Off Alone’
5. God-sized – ‘Fight and Survive’
6. Ecthirion – ‘Eagle’s Wings’
7. God-sized – ‘Bleed on the Inside’
8. Kaizen – ‘Time and Tide’
9. ChaosBlood – ‘Bossanova Massacre’
10. Thousand Points of Hate – ‘Scar to Mark the Day’

#### CD 2

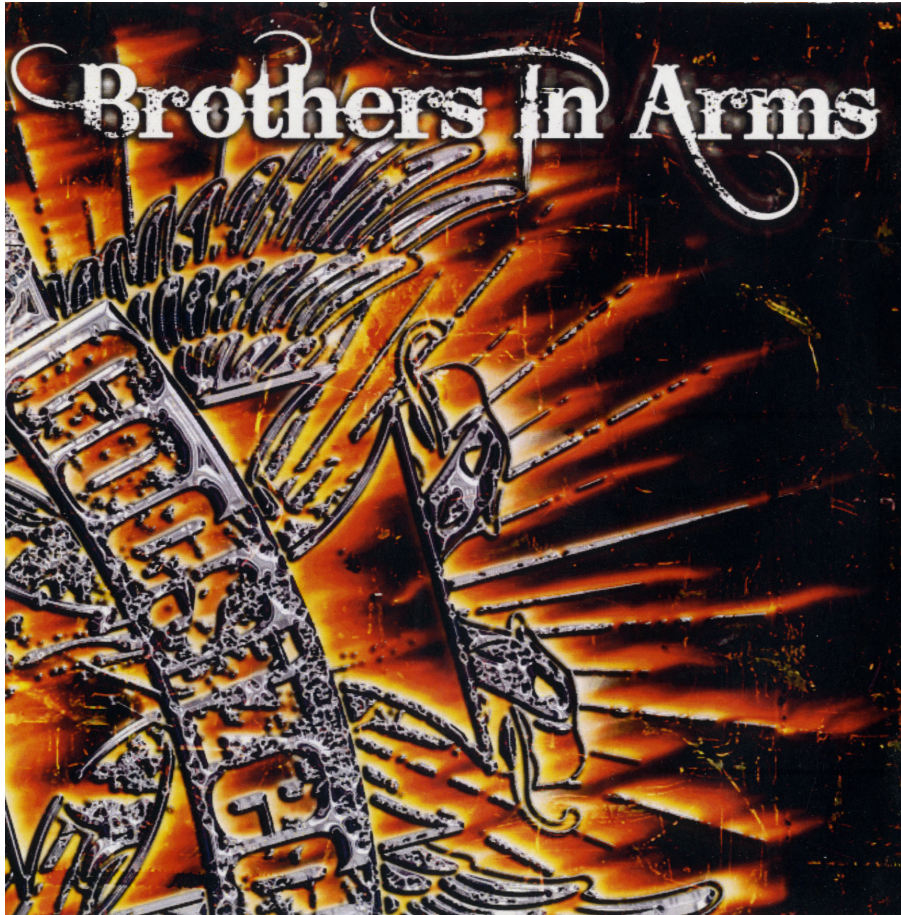
##### Track Listing

11. City of God – ‘Requiem’
12. Head On – ‘The Fire is Lit’
13. Everything For Some – ‘Should be Now’
14. Gone Til Winter – ‘Deep Sleep’
15. Kill 2 This – ‘The Universe in a Nutshell’
16. Everything for Some – ‘When It’s You’
17. Psylence – ‘Pay On Demand’
18. Evocation – ‘天靈靈地靈靈’

Godsized – Brothers In Arms

Song Name – ‘Walking Away’

Track Number 1 on CD.1



Godsized would like to thank (in no particular order) :

All our friends and family for their continued support, Mark Mynett, Super-Dan, Oz, Emma & the whole team at Rainbow Trout studios, Rick Markee-Hicks and all the Frantic Promotions team, Marie GC, Stephen "stuntman" Stavros, Chloe Scannapieco, Malcolm Dome, and all at Totalrock, Carl Nielsen at Rockbottom, Laz and all the staff at Plug & Play, Lukeman, Tim at Bare Knuckle Pickups, James at Peavey, Huddersfield Uni, Alli Hodge and all the Feedme Music team, Pete the Ledge, Dom and all the staff of the Brief - Croydon, All the team at Drumwright, Terry Gallagher, The entire cast of Predator, Alex Cooke, Twang & George, Bri Fitzpatrick at Utter-Madness Design, Alexdood, Liam O'Shea, Michael Stewart, Vikram Wigwam, Hagen, Amber & Kawa, Artie Fufkin - Polymer records, Robb & Ruth and all at Eternal Tattoos Dorking, Oli, Seb & Cat from Mantra, Matt and our buddies in Outcryfire, Mordecai, Warren and the dudes in the Blood Island Raiders, the Black Hand, Jase & Snakebite, Will & our buddies in Sedulus, Dan and the dudes from Sons of Merrick, Rosewest, Basskniv3s. Most of all big cheers to you, for buying this CD and helping us out - you fuckin rock.

Godsized are:

Glen Korner - Lead Vocals & Guitar. Neil Fish - Guitar. Effen - Drums. Gav Kerrigan - Bass.

All recorded Bass parts performed & composed by Stephen Clements  
Hammond organ on 'Brothers In Arms' - Colin Meleod

Photography by Marie GC - [www.mariegc.com](http://www.mariegc.com)

Artwork by Brian Fitzpatrick - [www.myspace.com/utter\\_madness](http://www.myspace.com/utter_madness)

CD booklet layout - Stav, Effen & Fish

Godsized are endorsed by, and proudly abuse: Peavey, Tama & Bare Knuckle pickups, they are still working on their Jack Links Beef Jerky endorsement however.

Produced, Engineered and Mixed by Mark Mynett ([www.mynettaur.com](http://www.mynettaur.com))

Recorded at the Blue Rooms Recording studio, Huddersfield Uni - August '08

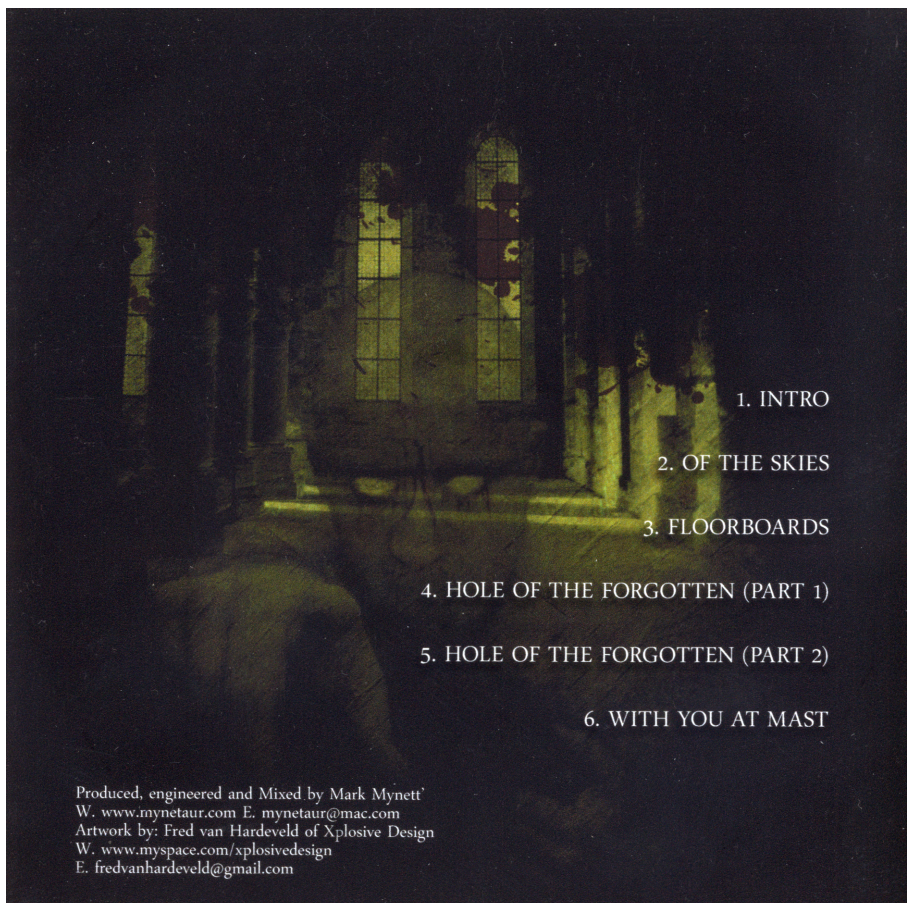
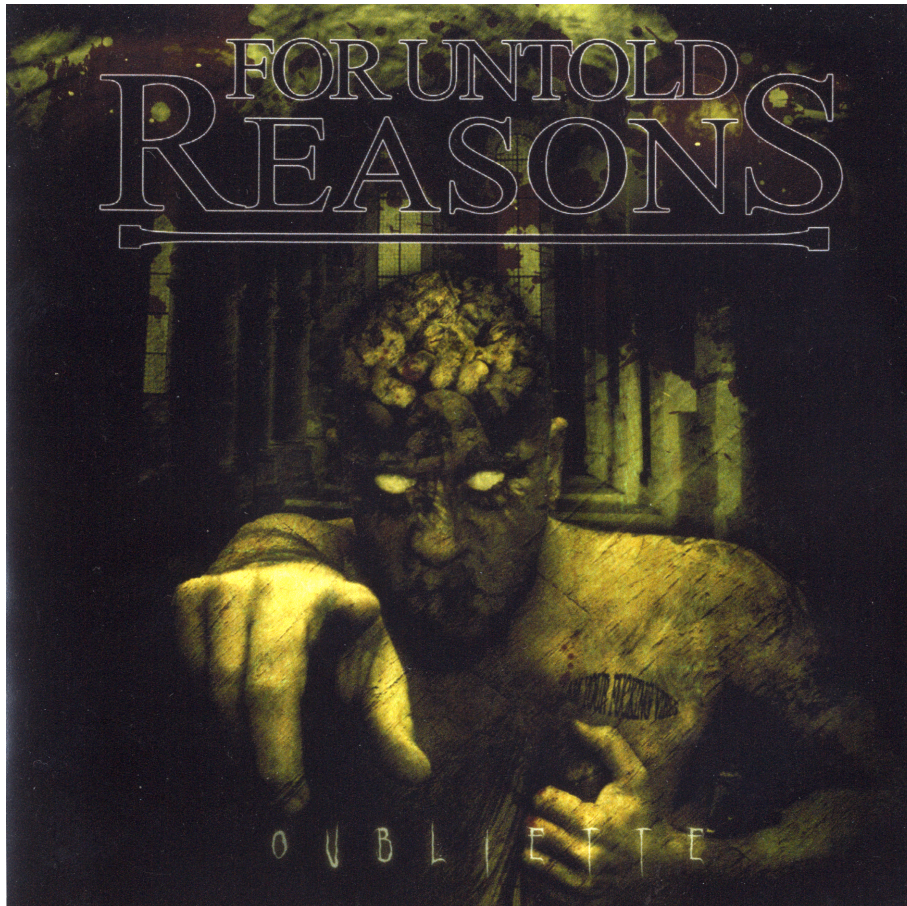
Mastered by Brian Gardner at Bernie Grundman mastering, L.A



For Untold Reasons – Oubliette

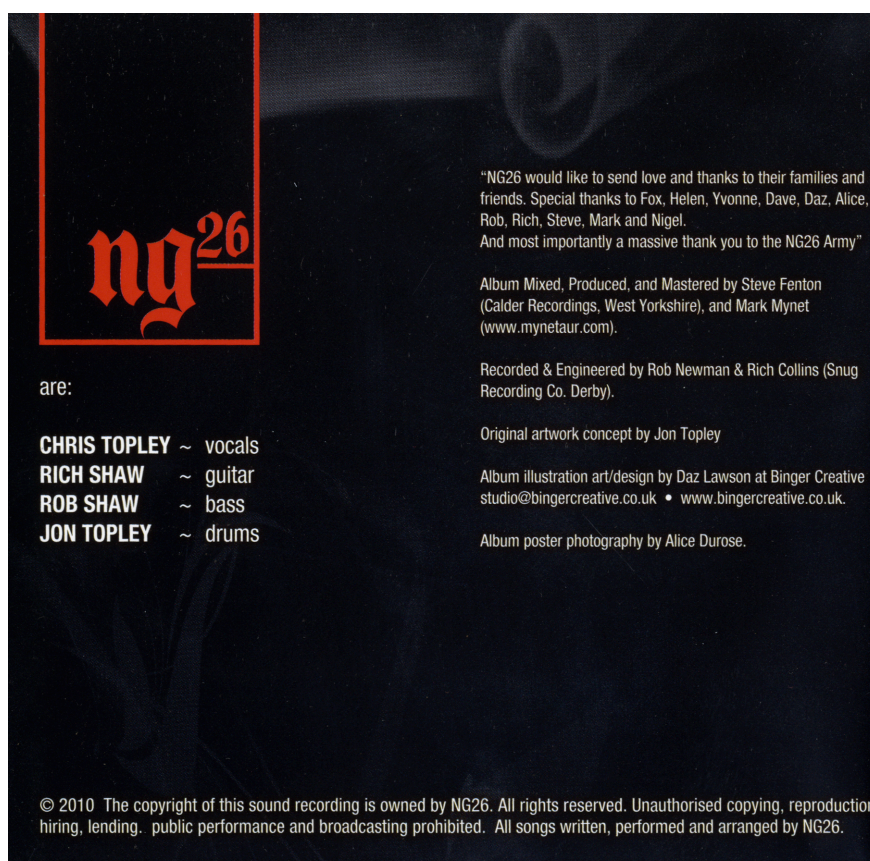
Song Name – 'Of the Skies'

Track Number 2 on CD.1





NG26 – Open Your Mind  
Song Name – ‘Bring Back the Day’  
Track Number 3 on CD.1





# Nothing Gained – Hollow Rhetoric

Song Name – 'Better Off Alone'

Track Number 4 on CD.1



*Paper Thin*

Don't touch its paper thin  
Wear me out so crumble down  
Conceal your fate in here  
Walk away from fear

Your tiny voice, stuck inside my head  
Screaming, screaming let me out  
Don't want to live, don't let it die  
Keep it in limbo until the end of time

I can't stand, I can't stand, I can't face it  
AGAIN

I can see the end  
I can see the start  
As you reach in for my swollen heart  
Feed me happiness I need you  
And your ancient blood

Crumble down, I fall so far  
So far away take your mind so far away

Your paperthin, so close to the edge, your paperthin  
Hold on, till the end, paperthin your paperthin  
close to the edge

*Dead = Me*

Oh my friend I let you go  
What you meant you'll never know  
How you die in me  
Die in me

She catches everything beautiful I have seen, I have seen  
And all your flowers will and die on me, die on me  
Crush take spit out move it away  
Pick that shit for another day, your face smile  
in my face  
I wanted to stay  
You made me insane  
You drove me away, beg me to stay, trace it away

I love you so, I love you so  
I'll beat you till your dead  
Oh my friend I let you go, what you'll mean you'll never know  
I want you whole, I want you whole  
Live inside my head

*Dead In Me*

You just a user, you know it's true  
How about I use everything against you  
Shut up what you let me speak  
Oh your friendship was just weak  
And your always right, I know

ENGINEERED, PRODUCED, MIXED AND MASTERED **MARK MYNETT** (Mynett@mac.com)

ALL SONGS WRITTEN BY **NOTHING GAINED**

ARTWORK & LAYOUT BY **MICHAEL C. MORPHETT @ M:29 CREATIVE**

BAND PHOTOGRAPHY BY **MARTY KAUFMANN**

NOTHING ARE ENDORSED BY

AND PROUDLY USE

**BOSS** **DW** **DrumTech** **Heckler & Kollar** **ESP** **SimS** **SHURE**



Godsized – Berzerkus

Track Name – 'Fight and Survive'

Track Number 5 on CD.1



1. Walking Away
2. The Phoney Tough and the Crazy Brave
3. Brother in Arms
4. Fight & Survive
5. Bleed on the Inside
6. The Last Goodbye
7. So I'm Told
8. Head-Heavy



**Jägermeister**

[www.jagermeister.co.uk](http://www.jagermeister.co.uk)

All tracks Produced, Engineered & Mixed by Mark Mynett  
Mastered by Seva, Soundcurrent Mastering, Knoxville, Tennessee

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Unauthorised copying, hiring, lending, public performance and broadcasting of this recording prohibited.

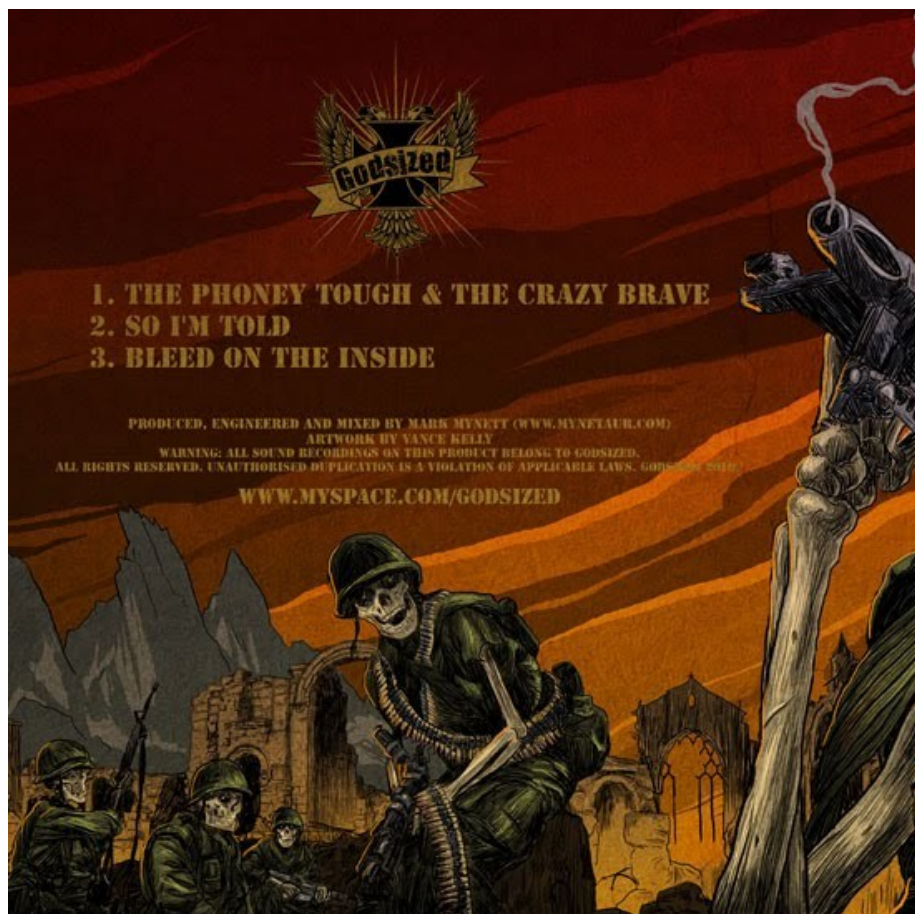
Ecthirion – Demo  
Track Name – ‘Eagle’s Wings’  
Track Number 6 on CD.1



Godsized – The Phoney Tough and the Crazy Brave

Song Name – 'Bleed on the Inside'

Track Number 7 on CD.1





Kaizen – Sink

Track Name – ‘Time and Tide’

Track Number 8 on CD.1



### **Credits**

**KAIZEN is**

**Johann Porcher - Vocals**

**Julien Maurel - Guitars, Acoustic guitars**

**Sebastien Dijoux - Guitars**

**Luc Baghadoust - Bass**

**Fabien Rault - Drums**

**All Drums recorded by Laurent Caradec**

**Produced, engineered and mixed in January-February '05 by Mark  
Mynetaur Studio Stockport (Manchester) UK**

**Mastered by Jon Blamire at the Digital Audio Company in Skipton, UK**

**Piano in "Descending" performed by Lalie Serfati  
and recorded by Eric Vantey**

**Cover artwork by Carlos Holmberg at Nailstream**

**Booklet designed by Mika Mäkelä and Julien Maurel**



ChaosBlood – Fragments of a Shattered Skull

Track Name – 'Bossonova Massacre'

Track Number 9 on CD.1

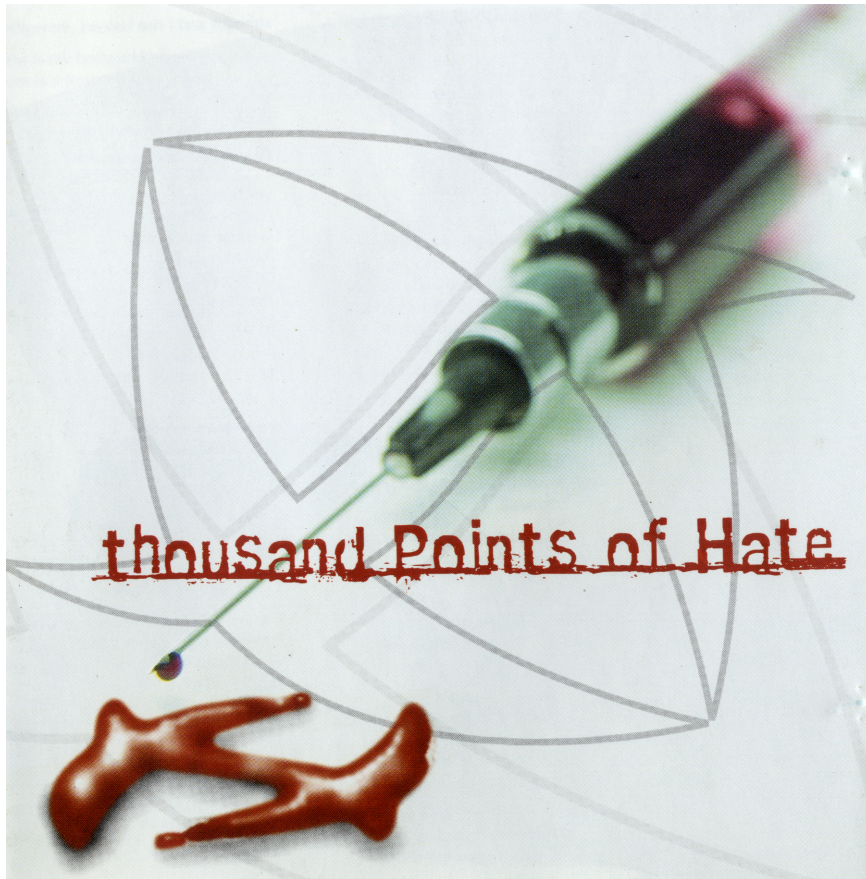




Thousand Points of Hate – Scar to Mark the Day

Song Name – ‘Scar to Mark the Day’

Track Number 10 on CD.1

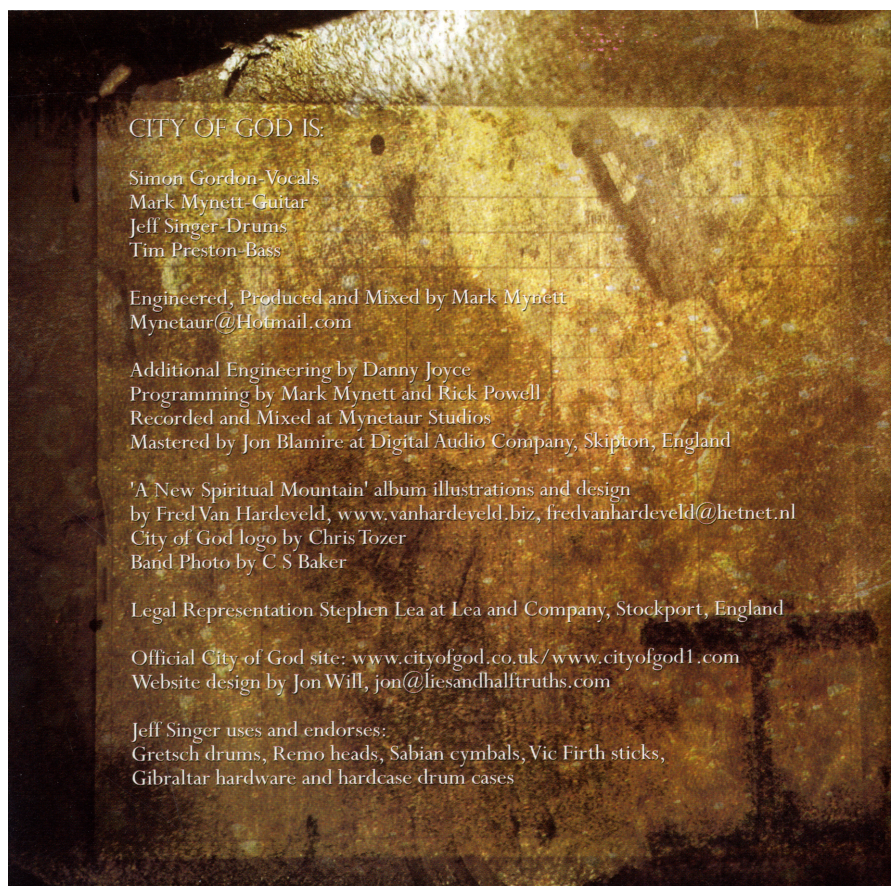
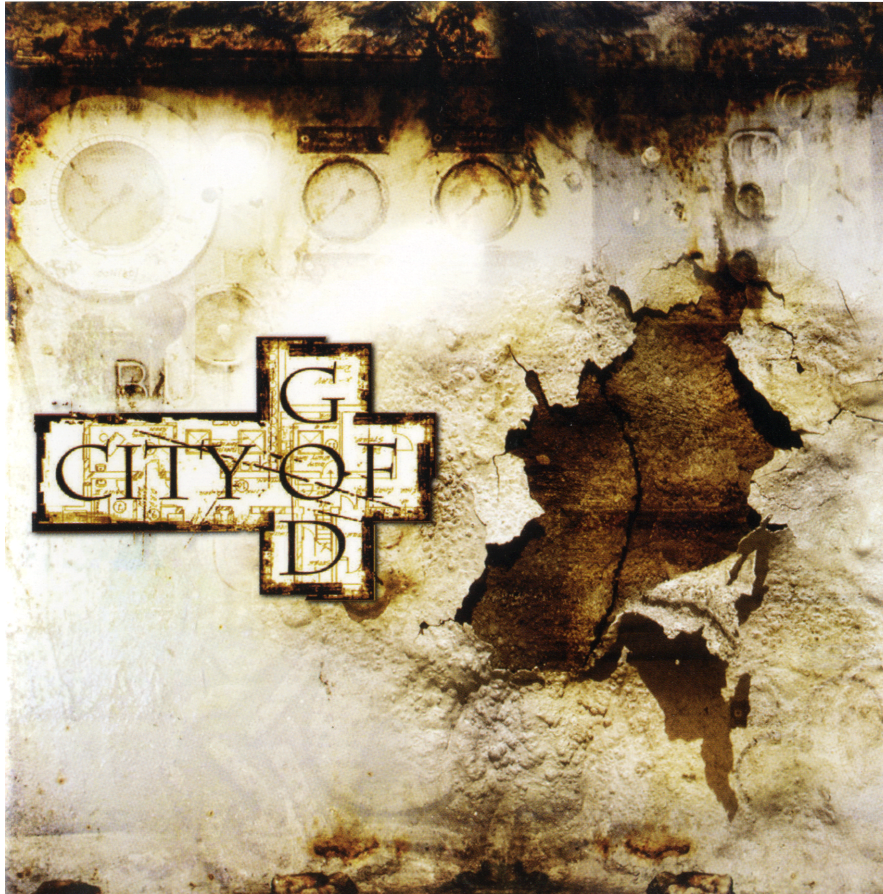




# City of God – A New Spiritual Mountain

Song Name – 'Requiem'

Track Number 11 on CD.2



## CITY OF GOD IS:

Simon Gordon-Vocals  
Mark Mynett-Guitar  
Jeff Singer-Drums  
Tim Preston-Bass

Engineered, Produced and Mixed by Mark Mynett  
Mynetaur@Hotmail.com

Additional Engineering by Danny Joyce  
Programming by Mark Mynett and Rick Powell  
Recorded and Mixed at Mynetaur Studios  
Mastered by Jon Blamire at Digital Audio Company, Skipton, England

'A New Spiritual Mountain' album illustrations and design  
by Fred Van Hardeveld, [www.vanhardeveld.biz](http://www.vanhardeveld.biz), [fredvanhardeveld@hetnet.nl](mailto:fredvanhardeveld@hetnet.nl)  
City of God logo by Chris Tozer  
Band Photo by C S Baker

Legal Representation Stephen Lea at Lea and Company, Stockport, England

Official City of God site: [www.cityofgod.co.uk](http://www.cityofgod.co.uk)/[www.cityofgod1.com](http://www.cityofgod1.com)  
Website design by Jon Will, [jon@liesandhalftruths.com](mailto:jon@liesandhalftruths.com)

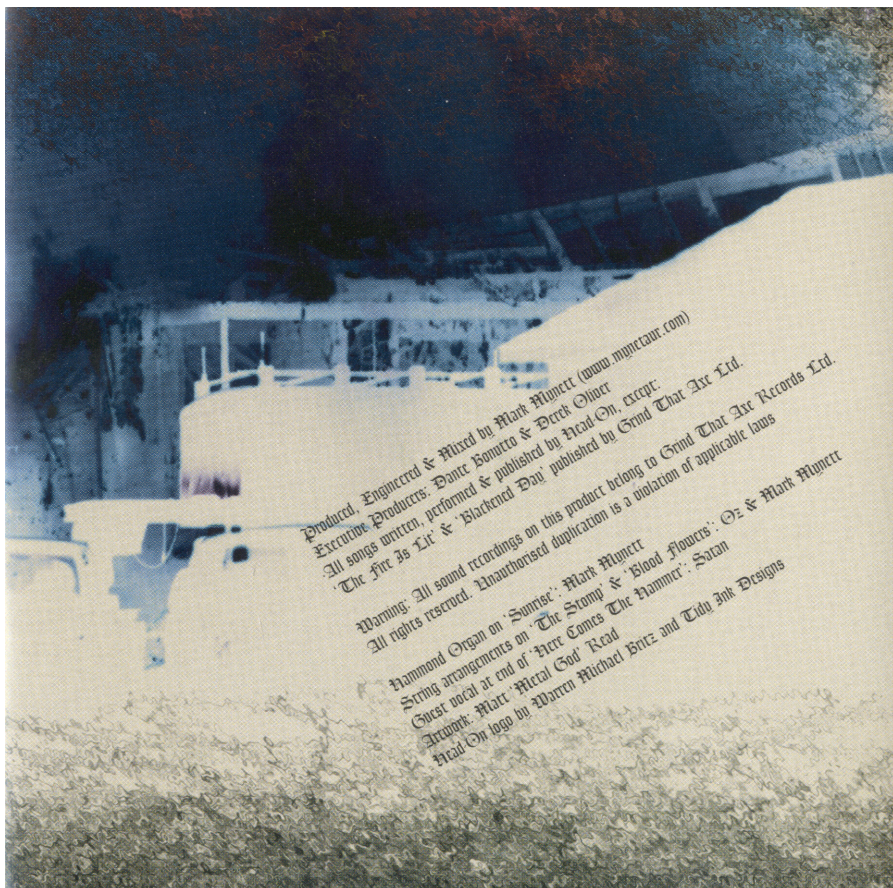
Jeff Singer uses and endorses:  
Gretsch drums, Remo heads, Sabian cymbals, Vic Firth sticks,  
Gibraltar hardware and hardcase drum cases



Head On – XXL

Song Name – 'The Fire is Lit'

Track Number 12 on CD.2



Produced, Engineered & Mixed by Mark Munter ([www.munter.com](http://www.munter.com))  
Executive Producers: Dave Bonetto & Derek Oliver  
All songs written, performed & published by Head On, except:  
'The Fire Is Lit' & 'Blackened Day' published by Grind That Axe Ltd.

Warning: All sound recordings on this product belong to Grind That Axe Records Ltd.  
All rights reserved. Unauthorised duplication is a violation of applicable laws  
Hammond Organ on 'Sunrise': Mark Munter  
String arrangements on 'The Strong' & 'Blood Flowers': Oz & Mark Munter  
Guest vocal at end of 'Here Comes The Hammer': Satan  
Artwork: Matt 'Metal God' Reed  
Head On logo by Warren Michael Bortz and Tidy Ink Designs



Everything For Some – Identity

Song Name – 'Should Be Now'

Track Number 13 on CD.2



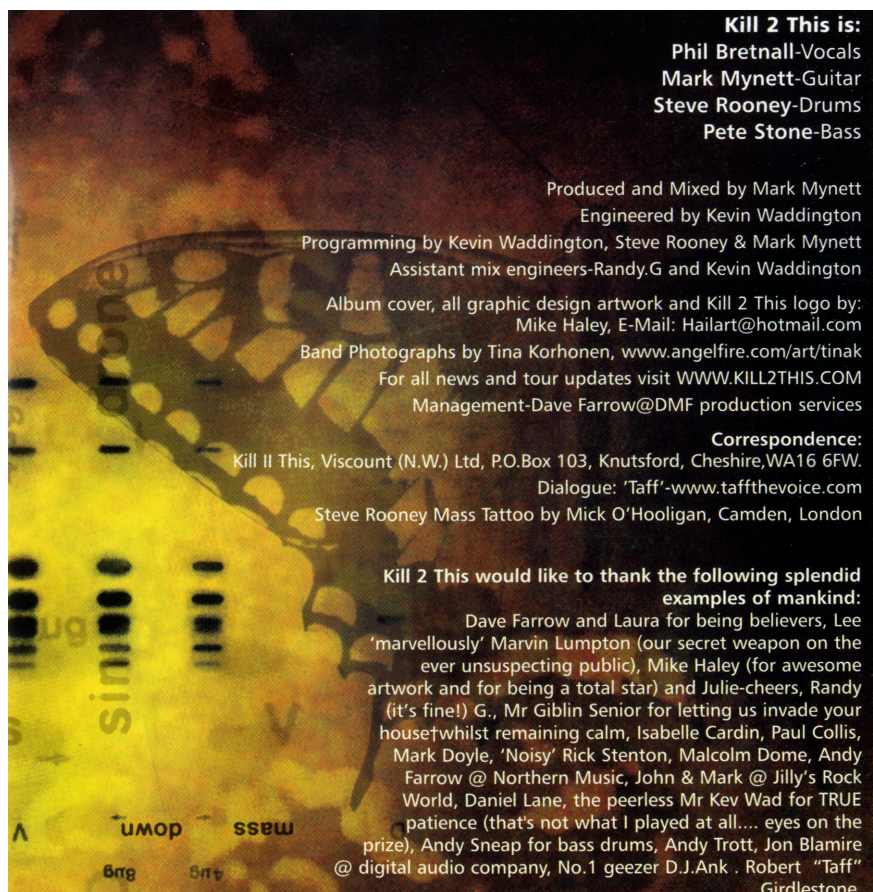
Gone Til Winter – Demo  
Song Name – ‘Deep Sleep’  
Track Number 14 on CD.2



## Kill 2 This – Mass Down Sin Drone

Song Name – ‘The Universe in a Nutshell’

Track Number 15 on CD.2

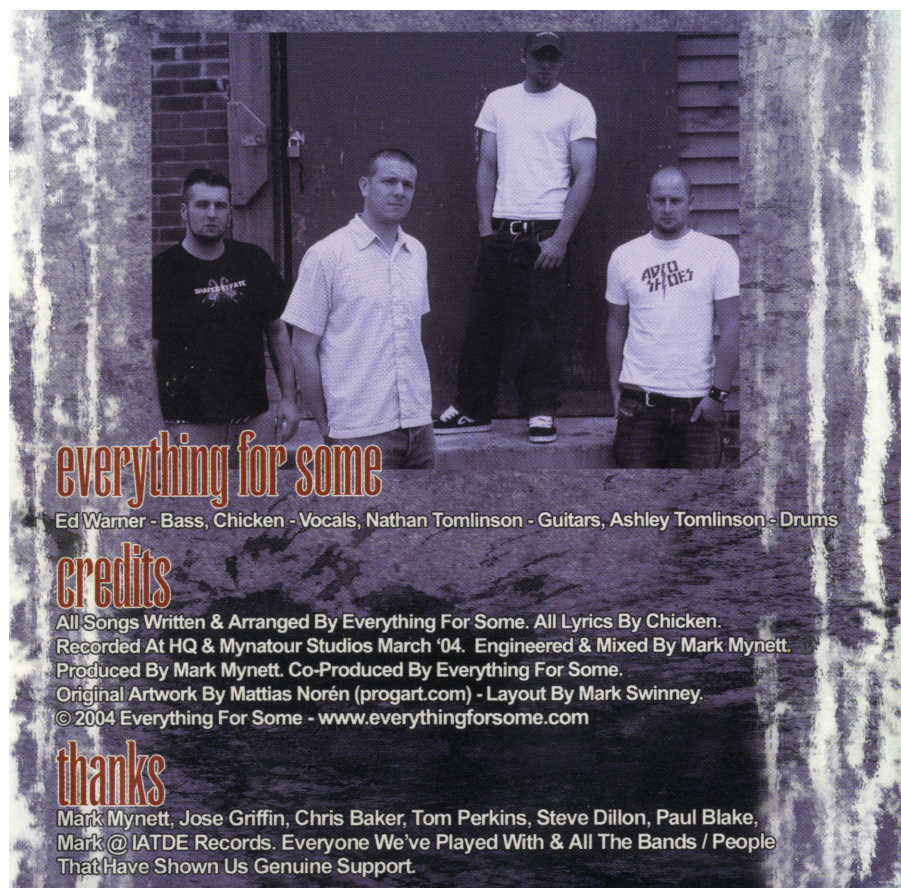




Everything For Some – A Thought Refused

Song Name – 'When it's You'

Track Number 16 on CD.2





Psylence - Through Distorted Eyes

Song Name – 'Pay On Demand'

Track Number 17 on CD.2



Psylence are:  
Guitar/Vox-Craig  
Guitar John  
Bass Lee  
Drums Dave  
Decks/Samples/Keys Nick

Extra Vox on tracks 3 and 4 Mark Mynett  
Extra vox on tracks 2, 6 and 10 Taff the voice

All Lyrics by C. Wilde except Ninety 8 by N. Houel  
Music by Psylence

Mixed, Recorded Sept 2004 / July 2005  
At HQ Studios and Hellfire Studios

Mastered at Digital Audio  
Engineered, Produced and Recorded by Mark Mynett and Psylence  
Band Art David Ince, Band Photo Rich Sanderson

Band Thanks  
Jose and Mike Copro and JMG  
All the Bands we have played with  
Anyone who has come to see us  
or helped in any way  
All our friends (We thank you the most)

Craig and Lee dedicate their work on this  
album to their Grandma, missed but not forgotten

Nick uses Vestax DJ Equipment

Pay on Demand  
Ninety 8  
Equality  
Take on one and All  
Place called Home  
Forensic  
Lethal dose for all  
Deep within  
Parasite  
Break the wall

Evocation – Debut Album

Song Name – ‘天靈靈地靈靈’

Track Number 18 on CD.2

## **Appendix 6**

### **The Interviews**

# Appendix 6

## The Interviews

The complete list of interview questions for both producer interviewees is presented.

The author's own background as a record producer, with inside knowledge of the industry, led directly to the informal, but semi-structured, interviews with two of contemporary metal music's key producers Russ Russell and Andy Sneap. The initial question was purposely worded to be as open as possible, thereby allowing the interviewees to provide their opinion and focus on any relevant area they felt appropriate without influencing what that area might be in any way. The remaining questions related to what the author felt was the most pertinent areas of pre-production, engineering and mixing. However, a number of questions concerning mastering, or master bus processing were also presented.

Due to the length of format that these video interviews needed to be published within, only the most informative and enlightening responses were included.

## Interview Questions

1. What are the unique points about contemporary metal production that separates it from rock or more traditional metal production, for example?

### Pre-Production

2. What are the most important areas of pre-production for you?
  - If not mentioned without prompting, ask about **Click-Tracks**
  - Do you try and get the guide tracks recorded to the clicks for the drummer to practice to? Is it usually just a guide guitar?
  - Do you join bands in rehearsal? Do you record these?
  - Equipment. Any essential items for tracking? Drums/type of bass/guitar, amplifier/cabinet/loudspeakers?

- What drum kit preparations do you make before miking up?
- Pre-production considerations for the vocals?

## **Engineering/Recording**

1. What is your approach with kick mics? Make/position?
2. Do you use any methods for minimising the kick bleed onto the other mics when you anticipate a lot of editing or kick building work?
3. Overheads, how many mics, spaced pair, near coincident?
4. Do you use room mics for your drum tracks? How many?
5. Do you record with triggers to implement samples from, or use to open the gates?
6. Pre-prepared samples or samples of the acoustic kit used for tracking? Ambient or spot mics for creating samples?
7. Bass. How many tracks? Amp simulation? Separate distorted track? What source for distorted?
8. How many rhythm guitar tracks? What mics/combination?
9. Any thoughts about capturing note definition in the low end re. down tuning?
10. A lot of mids when recording guitars, then adjust accordingly in the mix, or few mids?
11. Any techniques for recording aggressive vocals with a wide dynamic range?
12. Do you ever use any EQ whilst tracking?

## **Mixing**

1. What do you feel are the most important areas when mixing contemporary metal?
2. Do you have a common approach to all mixes, e.g. sequence of instruments, creating groups
3. What software/Tab to transient do you use to line drum samples up?
4. Drum samples as replacement or reinforcement?
5. How many kick and snare drum samples will you usually layer, or will you just use one?
6. Any tricks with the samples e.g. feed more of the sample to the reverb than the acoustic snare?



7. Do you phase time-align your spot-mics with your overheads, and room mics, if used, or the other way round, or do you feel that gating takes care of any phase issues?
8. Overheads hard left and right? Compression on overheads?
9. Gates on kick and snare – side chained?
10. Do you ever use parallel compression for your drum tracks? Or do you use serial compression (channel as well as group compression)?
11. Drums panned from audience or drummer perspective?
12. Groups for drums and mix overall?
13. Any pointers about keeping a controlled, tight low-end, particularly between kick and bass, whilst keeping the sound 'heavy'?
14. Any intelligent EQ principles...mirrored EQ-boost on one, cut on another?
15. High Pass Filters...all instruments, or which? The busier the mix the higher the frequency for the HPFs?
16. Guitars hard left and right, compressed? Individual EQ or all on the group?
17. Drive on the bass?
18. Drive on the vocal?
19. Serial Vocal Compression/Parallel?
20. How many reverbs for the whole mix?
21. Do you use a spectrum analyser much?
22. Do you use reference mixes?
23. Volumes whilst mixing?
24. Do you reference you mixes in other environments, or do you trust in your knowledge of the mix room?

## **Mastering**

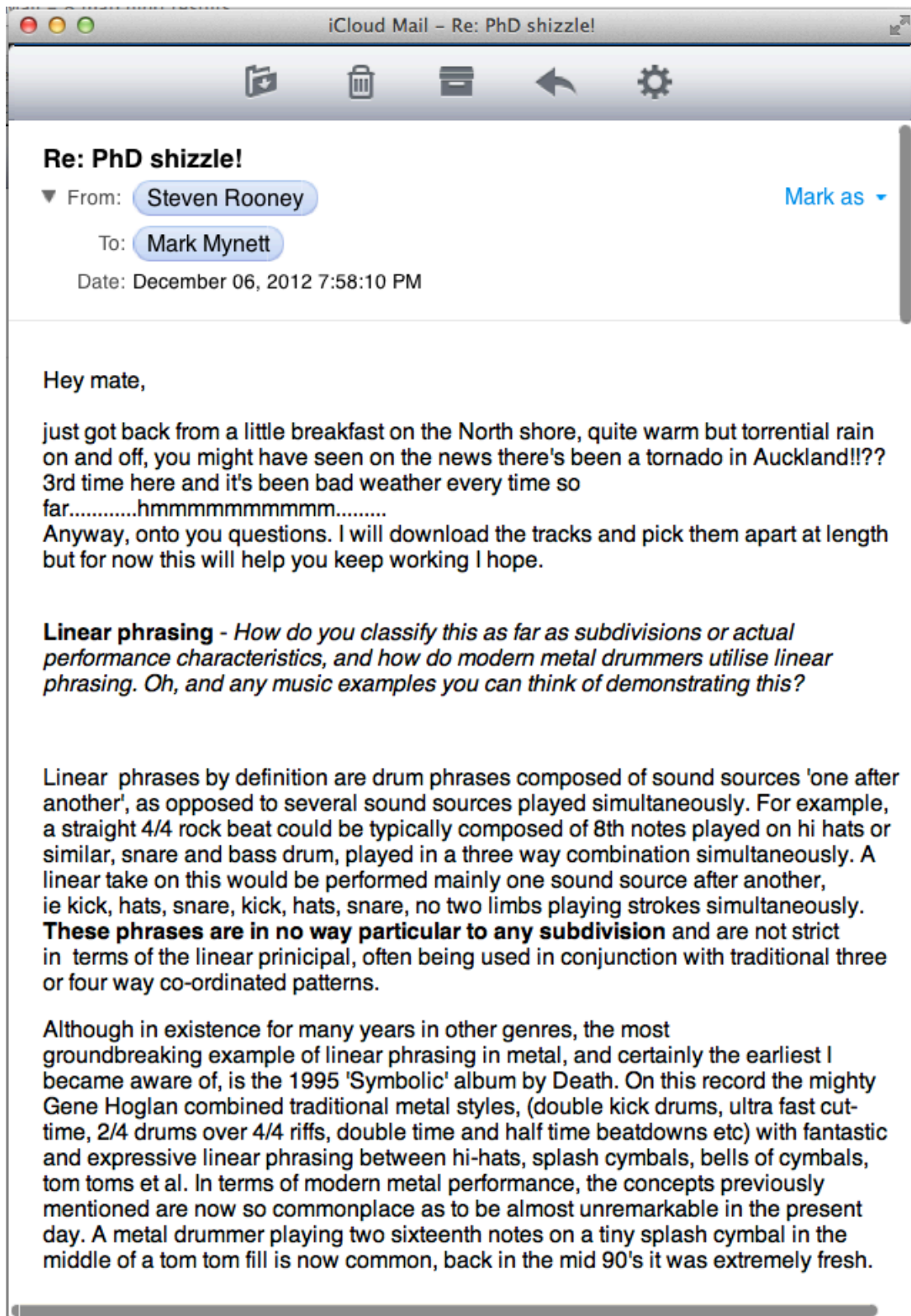
1. Mastering is an art and a science reserved for the experts?
2. Do you master yourself?
3. What makes a good track for mastering for extreme metal?
4. What sort of master bus processing do you tend to go for whilst mixing? A mastering plug (Ozone) or just compression? Maxim
5. Do you send tracks off for mastering with compression over the master bus?

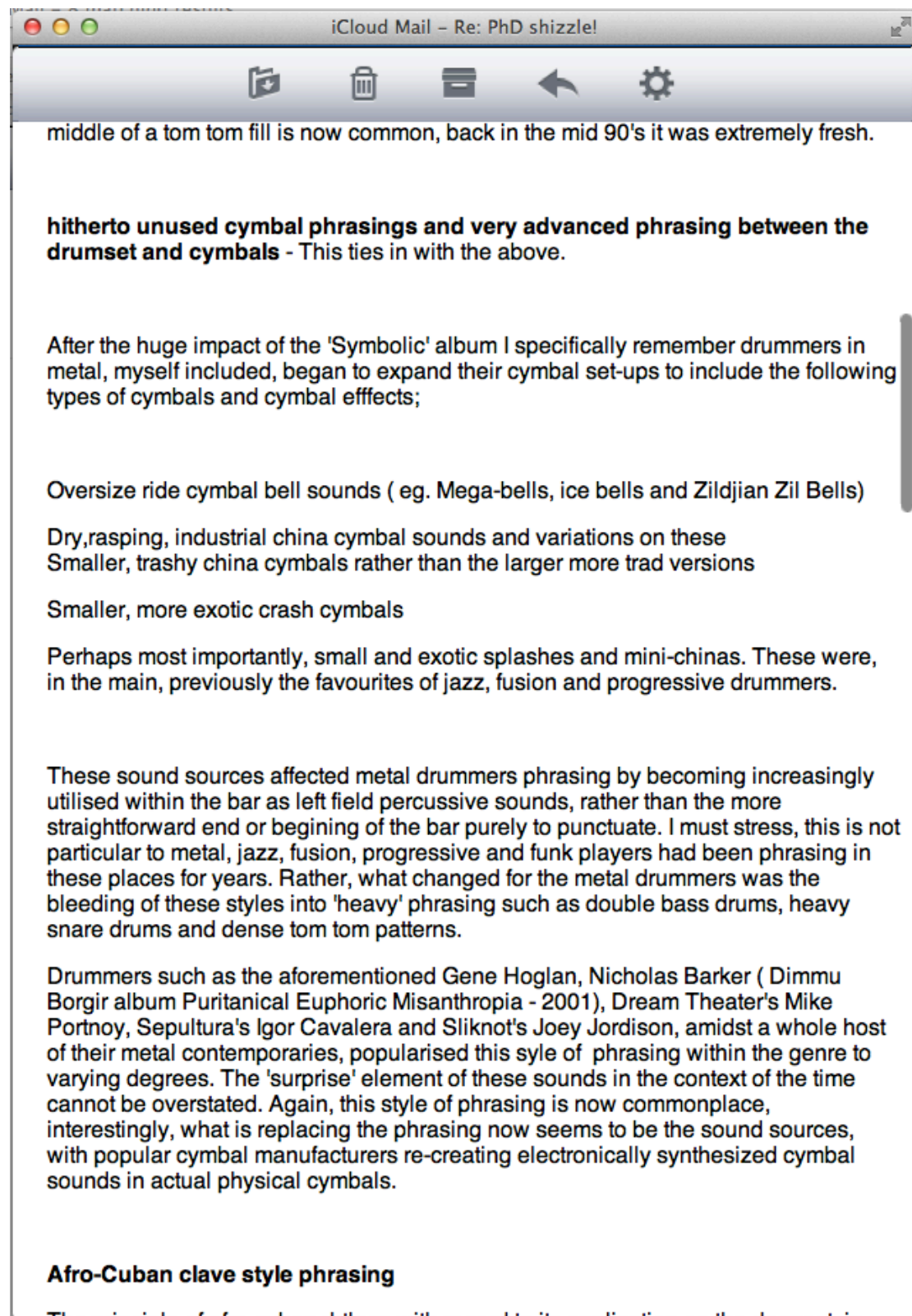


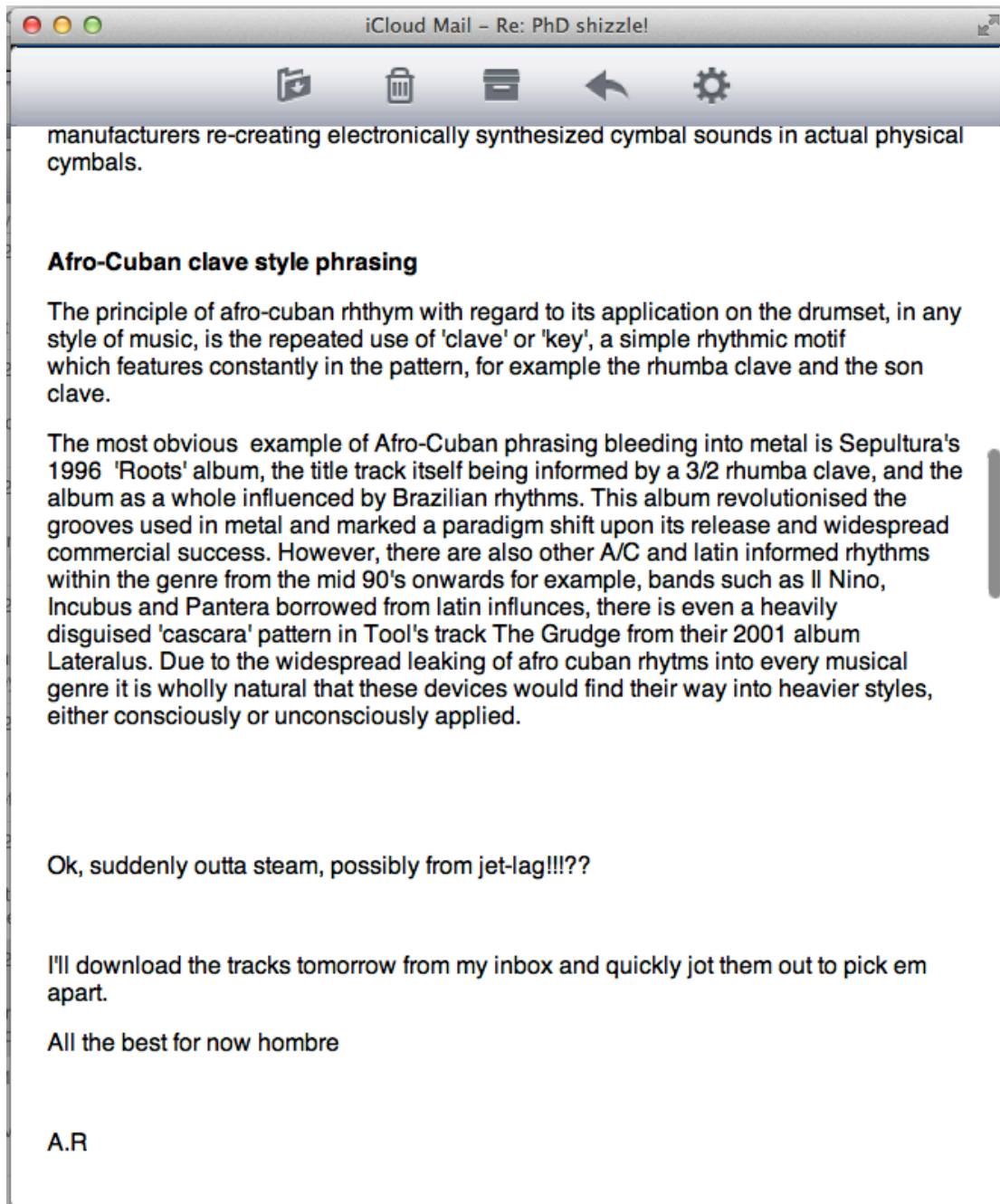
## **Steve Rooney Interview**

The author carried out a number of field interviews into various aspects of CMM drumming with Steve Rooney, who is a columnist for Drummer magazine, and artist/columnist for Rhythm magazine. As a live and recording session musician performing in the UK, European, Scandinavian and LA metal scene for over twenty-five years, Rooney has also conducted classes and seminars on metal drumming at London's Drumtech institute.

The first interview was on 10<sup>th</sup> November 2012, and was carried out in person. Following this, the author sought clarification on a number of performance perspectives and techniques that had been discussed. The email response providing these clarifications was received on 6<sup>th</sup> December 2012, and is presented below.







## **Item 1**



# **The Art of Record Production**

## Intellectual contribution of the candidate

I acknowledge that Mark Mynett was the main author of the following publication:

Mynett, M. and Wakefield, J. (2009) The use of click tracks for drum production within the Extreme Metal genre. *Proceedings of the 2009 Art of Record Production*, 13-15 November 2009, London: Association for the Study of the Art of Record Production.

Signed

A handwritten signature in black ink, appearing to read 'J. Wakefield', with a horizontal line extending to the right.

Dr Jonathan Wakefield



# **The Art of Record Production Conference Proceedings**

## **The use of click tracks for drum production within the Extreme Metal genre**

**Mark Mynett,  
Jonathan P Wakefield,  
University of Huddersfield**

### **Abstract**

This paper explores the use of click-tracks and the benefits they enable for drum production within the extreme metal genre. The paper will focus on the drum production of 'Sink', the second album by French act Kaizen which was produced, engineered and mixed by the first author of this paper and released through Sony in 2005.

This paper will reflect the first author's eight years experience producing within the metal genre including releases through Sony and Universal. He has worked with the likes of Colin Richardson, Andy Sneap and Jens Bogren and contributions with various producers, as well as professional musicians from the genre will be included in this paper.

For extreme metal acts, accuracy is more important than vibe, feel or groove in the drum performance. The kick drum work and the beats, patterns, subdivisions and syncopation involved demand the very highest standard of precision and accuracy to facilitate the tightest possible production. The use of a click track provides an essential central reference point in forcing a drummer to tighten up his beats and parts and allows



the producer to accurately assess this, which enables a precise standard of drum performance.

However, to take advantage of these benefits, the use of a click needs to be a central aspect of pre-production. Here, a producer will often need to be involved, for example in the mapping out of the song's tempi, and the recording of guide tracks for the drummer to rehearse to. The drummer's rehearsal time to the clicks and guides are a vital element of pre-production and their importance cannot be overstated.

Additionally, due to the particularly fast kick drum patterns involved (double kick drums/double kick pedals are a prerequisite) and the often rhythmically intricate and complex nature of the drum parts, it is normal for the drum tracks heard on a finished production to not entirely be as performed. Often a variety of kick-pattern building, drum editing and quantisation methods will have been employed to produce very tight drum performances. This is one of the particular production challenges of the genre and ultimately the use of clicks when recording the drums facilitates these methods and the tools involved.

This paper looks at these issues in the context of the drum production of the album 'Sink' and additionally covers challenges specific to that production. On commencing recording of the drum tracks it became obvious that the drummer was unable to perform the vast majority of the double bass drum work for the often-complex parts. Measures were therefore taken to minimise any bleed of the kick drums onto the other microphones, so that the entire performance of the footwork involved could be built with samples. In essence, the tightness, accuracy and consistency of the final drum performance could not have been achieved without the use of a click-track during tracking.

## **Introduction**

Extreme metal is a generic term for a number of related heavy metal subgenres that are considered as being faster, harsher, heavier or more aggressive than more traditional mainstream heavy metal (McIver, 2005).

However, according to Keith Kahn-Harris, the defining characteristics of extreme metal can all be regarded as clearly transgressive, as the 'extreme' traits noted above are all intended to violate or transgress given cultural, artistic, social or aesthetic boundaries. (Harris, 2005, p.29)

Producing extreme metal will usually display a different design ethos than other genres. This is partly due to the essential 'heaviness' and weight required from down-tuned 'heavy' music, combined with a particular emphasis on definition and intelligibility to retain the clarity of the often complex, virtuoso performances. Additionally, these performances are often provided with a sense of hyper-realism by the production.

This paper begins with an analysis of the benefits to be gained from using click tracks, and the benefits to be gained, when using click-tracks for recording drums for the extreme metal genre. Specific reference will then be given to the production of the sophomore Kaizen album 'Sink'.

## **Creating the Right Foundation**

The use of click tracks has particular relevance to the extreme metal genre. Although there are styles of music where the use of a metronome is not desirable, so that the tempos are allowed to breathe slightly, this is predominantly not the case for extreme metal. For most bands within the genre, it is a misconception that using a click track kills the vibe, feel or groove in the drum performance. Paul Bostaph from metal acts Slayer, Forbidden and Testament feels that he's so comfortable playing to a click now, that a live feel is still retained (Modern Drummer, 2008, p.81) and Dave Lombardo (Slayer, Grip Inc, Fantomas) on the subject of whether the drum tracks for the Slayer album 'Christ Illusion' were recorded with a click-track said 'Yes. There was one tune where we wanted to speed up the ending, so we turned the click off at that point. But that was it. You have to be able to play to a click today. I really like using one. I think it's helped me a lot.' (Modern Drummer, 2006, p60)

In extreme and modern metal, the kick drum work and the beats, patterns, subdivisions and synchronisation involved with the bass and guitars, demands the very

highest standard of precision and accuracy to facilitate the tightest possible production.

The use of a click track provides an essential central reference point in forcing a drummer to tighten up his beats and parts and allows the producer to accurately assess as such. A much more accurate, tighter and higher standard of drum performance is therefore enabled. The following quote from producer Russ Russell, (personal communication. 10<sup>th</sup> July 2009) supports this. When asked for his opinion on using click tracks for the genre, particularly for the drum tracks he stated;

I don't always use them, but I would say more often than not these days, particularly as extreme metal has got more and more complicated, tempos have gone up and up and it has to be tight. People have a different expectation now, the threshold of accuracy and tightness has gone way up. If you listen to metal albums from twenty, thirty years ago, and if you delivered that kind of feel in metal now, people would feel that it is just not tight enough. People listen in a different way these days.

It is highly likely therefore, that from the very first contact a producer has with an extreme metal band directly that the subject of click tracks are discussed.

The following quote is from Meshuggah's drummer Tomas Haake and explains his and the bands attitude towards using click tracks for their studio productions.

I do feel we need a click...a lot of the stuff is really hard to play on guitar, which means that if I strayed over the course of a song and by the end I played 10 bpm more than at the beginning, it would be impossible to play on guitar. So I have to use a click track to maintain a steady pace.  
(Modern Drummer, 2008, p64)

Even metal bands with less common time signatures and challenging tempo changes, for example The Dillinger Escape Plan, take advantage of the benefits here, often spending considerable time fine-tuning the tempo-mapping to perfection. Gil Sharone from 'The Dillinger Escape Plan' states 'If you play to a click long enough, you start to have fun with it instead of being distracted or scared by it' (Modern Drummer, 2008, p90).

Once drummers are used to them, click tracks do not usually present that much of a problem, however most drummers with no experience of a click will be surprised at how

difficult it is to play consistently with one, so obviously the recording session itself is not the time or place for a drummer to be getting comfortable with one. Sometimes you have to do whatever it takes to get the right performance and recording and it is the producer's responsibility to take whatever steps he feels are necessary to achieve this. So, due to the essential benefits that the use of a click track brings to a project, it is sometimes the case that if need be, a producer will have to talk a drummer round to the idea of tracking his parts to a click.

Many producers observe that it is simply through lack of experience that the term 'click track' strikes fear in some drummers who struggle with the concept of having to follow one. However, in the initial stages the exact opposite should be the case, whereby the click should be made to follow the drummer. For recording purposes, there is always a perfect groove for every part of every song and obviously the key to getting the correct tempo for a click track is to work this out. If a drummer can be in a rehearsal room playing a song with a bassist and guitarist at a perfect steady groove and tempo, then there should be no reason that he can't do the same with a click track and guide guitar.

One method of working these tempos out is to get a recording from a rehearsal where there was a great performance of the song(s) tempo-wise. From here, it is a reasonably simple process to work out these tempos and for a DAW or a drum machine to be programmed with these tempos and a cowbell or woodblock used for the drummer to play to, or any other similarly piercing sound with plenty of 'body' that is easily distinguishable from the drum sounds being played.

Another method is to simply use a programmable product such as Tama's Rhythm Watch or Yamaha's Clickstation to provide a click track and work out the correct tempos during rehearsal, simply moving the b.p.m. setting up or down until the perfect pace is found for each part. Sometimes a single tempo is all that is required; otherwise tempo changes will need to be programmed for the relevant parts of the song.

Referring to this element of programming click track tempos, producer Andy Sneap, (personal communication. 16<sup>th</sup> August 2009) said 'One of the tricks is to write the groove so it lifts in the choruses and pulls back for certain parts, just to make it push and pull a little bit like it would do naturally.'

Some drummers prefer to have the first beat of the bar differentiated, perhaps with a higher cowbell or woodblock. In a situation where a drummer is having problems locking with the groove of the song, a technique definitely worth trying is to experiment with using a sound for the off beats. For example in the instance of a standard four beats to the bar rhythm, place clicks with a different sound than the down beats on the eighth notes in between. The following quote, once again from Meshuggah's Tomas Haake, demonstrates this principle;

But for this one we programmed the clicks with percussive stuff, so every one and three would be a stronger note, maybe on a cowbell, and 16<sup>th</sup> notes would play along in the background. It would be more of a swinging percussion beat instead of just a Tak, duk, duk, duk. That would just drive me nuts. To have more of a beat to play along to was really helpful.  
(Modern Drummer, 2008, p.62)

It is also worth considering moving from quarter notes to eighth notes for slower tempos, as the more space you have between each pulse, the harder it will be to keep tight.

In a situation where a band has neither the experience nor equipment required to take care of the tempo mapping on their own, then it is normal for a producer to join them in the rehearsal room and go through this together with them.

From here, it is generally advisable that the drummer has a period of time on his own, practicing to get his beats and parts as tight as he can with the click and getting comfortable with any tempo changes. This is a vital element of pre-production for the drummer and its importance cannot be overstated. Also, ideally, a producer should aim to have the drummer practicing along to exactly what he will hear when tracking the drums in the studio. A minority of drummers are able to practice and record to a click without any guide tracks whatsoever. As Tomas Haake says 'I actually don't have anything but the click track when we start tracking drums. I only hear me.' (Modern Drummer, 2008, p.61) Usually though, a drummer will be more comfortable having a guide guitar and/or bass/vocal-line present.

Sometimes, if a band is well experienced with pre-production, then they can be left to

record these guide tracks themselves. Otherwise the producer will get together with the whole band to record these parts. As well as being the perfect time to ensure that they are in complete agreement about the song arrangements/parts, it is also a great opportunity for the producer to get familiar with the songs and spend further general pre-production time with the band.

From here, the band should have the perfect template for the drummer to practice to, either with the rest of the band or without. It is usual for the drummer to be provided with a mix-down of two mono tracks with the click on one and the guide tracks on the other. The click alone can then be solo'd in rehearsal with the whole band (either with everyone hearing the click or just the drummer) or the guide tracks can be used as well if the drummer is rehearsing alone. Additionally, the great benefit here is that what the drummer hears when rehearsing alone to the guide tracks, should be exactly what he will hear in the studio when recording his parts.

Once the mapping and guides have been completed, a drummer should find that playing to the click track is relatively easy, and many find that once they have settled in, then the presence of the click is actually reassuring.

Generally speaking, if a drummer has the song arrangements properly down, then he can now concentrate on getting his beats and overall performance tight, hitting consistently and can forget about rushing ahead or dragging behind where the perceived correct tempo may or may not be.

Following the stage when the drummer has had plenty of time to rehearse to the clicks/guides, it is a good time for the producer to join the band in the rehearsal room to assess how tight the tracks are sounding and discuss any problems.

## **Exceptions**

Despite all of the above points about the benefits that the use of click-tracks, there are numerous exceptions to this general rule with bands who prefer to track without. Extreme metal band Machine Head's vocalist/guitarist Rob Flynn and drummer Dave

McClain (personal communication. December 9<sup>th</sup> 2008) explained the bands' attitude to click-tracks as follows;

Rob Flynn 'No way, for Machine Head we're totally against the use of clicks...they would kill all the feel and energy. We've only ever used a click track once on all our albums, and that was at the start of the track 'Violate' off 'The More Things Change.' ' Dave McClain; 'I record to Rob playing the guitar live with me for every take, which keeps the energy and feel we want'. When asked about how they then went about keeping the overdubs tight, when, for instance, tracking up a guitar riff over a number of bars on its' own without the rest of the band, Rob responded 'We don't bother keeping a high hat going, we just manually place clicks to the guide guitar and that keeps the feel we want, as well as keeping the overdubs tight'.

Also, although (as mentioned earlier) Paul Bostaph tracked to a click for the recording of the latest Testament album, he didn't use a click during his time with thrash band Slayer other than on their albums faster tracks, saying that he preferred the push and pull of the songs tempo when tracking without a click. (Modern Drummer, 2008, p.81)

## **From the Pro's**

However, as an example of other 'pro' drummers who have reaped the benefits of playing to a click track for the first time, the following quote is from Brann Dailor from extreme metal act Mastodon. Here, he talks about playing to a click for the first time ever for their new album 'Crack the Skye' and how the album's producer Brendan O'Brien approached the issue with him;

I used a click on this album for the first time ever. I'd always really shied away from it. It scared me to be honest. I'd always seen clicks as being for 'pro' players, and I don't really see myself in that bracket...You know I took to it as soon as we started. Brendan said 'look, let's just get it up and see how you get on, if it doesn't work, we'll lose it'. But it worked great. Brendan was very encouraging and said I was a natural...I have to admit that my not using a click had presented us with a few problems in the past. With a lot of our songs they'll start with a theme, then go somewhere else with a heavier feel, then return to the first theme again. And so I have to be careful that when we return to that part, it's the same tempo as we started...I was always a bit too fast (Without a click) when we were recording. Then you have to think very hard about slowing yourself down, then it feels too slow. It's a nightmare.  
(Rhythm Magazine, 2009, p42)

## **Hyper-Realism**

So far, this paper has concentrated on the benefits that using a click track provides to the accuracy and tightness of a drummer's performance and how this dramatically improves the producer's ability to accurately assess as such. However, one of the production characteristics of the extreme metal genre is that due to the fast double kick drum patterns involved, and the often rhythmically intricate and complex nature of the drum parts, it is normal that the drum tracks heard on a finished production are not entirely as performed. Often, a variety of invaluable drum editing/quantisation or kick-pattern building techniques will have been utilised to achieve the standard of accuracy and tightness required of the extreme metal genre's drum performance.

Essentially, the use of click-tracks when recording the drums facilitates these drum editing/quantisation and kick-pattern building methods and the tools involved. Making appropriate use of these techniques, which will generally fall into the following five areas, is a particular challenge for producers working within this style of music.

## **Playlists**

Although playlists are a particular function within the Pro Tools platform, I am using the term as a generic reference to recording multiple takes within the same arrangement within the edit window. The benefit here is that various takes of the same sections of a drum performance can be quickly, easily and accurately A/B'd against each other. From here, it is a relatively simple process to assemble the best takes of each section into a composite performance of the whole song and then perform any cross fades required between the various sections from the different playlists.

## **Edits**

These issues with compiling playlist performances not tracked to a click would be the same if attempting to paste good sections elsewhere within an arrangement. Even the slightest change of tempo within the arrangement, (which would be unavoidable without a click) would result in every subsequent section being time shifted in the appropriate



direction to allow for the pasted sections insertion. The process of incorporating these edits with the benefit of a click being used, will usually consist of nothing more than pasting the section and then finding an appropriate edit point for the cross-fade between the preceding and subsequent section.

General editing benefits are also provided for all instrumentation involved - parts can be simply copied and pasted within the arrangement (again not possible if the tempo between each has varied even marginally) and loops can be used if required, as can programming (meaning alternate remixes can more easily be done).

## **Overall Quantisation**

It will often be the case that further work will still need to be done to the drum performance, even following compilation from the multiple playlists and edits to repeat the best sections within the arrangement.

Here, an element of quantisation can be employed to tighten up the drum performance. In the author's experience, the 'elastic-time' function within pro-tools is the most powerful and effective method of quantising drums without any glitches or artefacts. Using time compression and expansion algorithms, Elastic Time allows you to stretch waveforms in real time without cutting the audio, as if it were MIDI data. In the context a drum recording, after changing all the tracks to play with an elastic algorithm, files are automatically analyzed and markers are provided at the transient points of the performance. These markers can then either be dragged to the correct grid line or quantised automatically, but in either instance, a tempo needs to be allocated as a reference.

Clearly therefore, there are numerous implications here when a click hasn't been used, as even after the desired tempo has been worked out and implemented, this will often need to change for subsequent sections where the tempo will have inevitably changed.

Obviously, the closer and tighter the performance has been to the click/grid, (as will

be the case when the drummer has actually played to the tempo map) then the easier, less time consuming and more natural, with less glitches, this method of quantisation will sound.

## **Kick Quantisation**

Occasionally, particularly with kick drum performances that are either very uneven or out of sync with the hand work, elastic time/quantisation will not work, or will stretch the audio in an inappropriate 'chewed-up' manner. This is because, ideally, elastic-time should be used to quantise all of the drum tracks collectively, to retain the phase relationship between these sources. Therefore, any extreme quantisation impacted on by the accuracy of the kick drums will similarly be applied to, for example, the hats and overheads, which can be quite unforgiving when being time-stretched excessively.

In this instance, when quantisation is not an option or sounds inappropriate when applied to all of the drum sources, the option of only quantising the kick work, which is usually the most challenging element of an extreme metal drum performance, can be a possibility.

Once again, if the performance in question has not been tracked to a click, then the same quantisation/edit limitations and implications as outlined in the 'Overall Quantisation' section will be relevant.

## **Kick-Building**

Alternatively, when the kick performance is so inaccurate as to become largely irrelevant, then samples can be used to 'build' these kick-drum patterns, by literally implementing samples into the session on its/their own track(s) and placing them throughout the arrangement as needed. These would be used in the mix instead of the kick spot mics.

When doing so, this would usually be carried out by the producer, with the drummer communicating the kick patterns required.

With the benefit of relevant grid lines from a click being used, it will always be clear where the downbeat for the bass drum is, and additionally samples can quickly be placed and copied, according to whether the kick pattern is based around sixteenth, thirty-seconds, or triplets.

With having this visual advantage, samples can usually be implemented relatively quickly and time can then be spent providing the patterns with a human feel, by not pasting the bass drums exactly to the grid, or alternatively slightly nudging them randomly away from the grid lines. This will mean that the overall perceived kick performance won't immediately sound to have been programmed, despite the high standard of overall accuracy and tightness.

Once a section is completed in this manner, it is a simple enough process to copy the bass drum patterns over to where the section is next repeated.

When carrying out kick-building when a click track has not been used, although not impossible, it is an incredibly difficult and even more heavily time-consuming process. This is due to the absence of a relevant 'grid' or any central reference around which to place the samples, meaning that, although rough visual spacing can be attempted, a trial and error basis will largely be relied upon, whereby individual kicks are moved around till the section is perceived as being tight enough. Once each section has been completed, the ability to copy the samples to the next time the pattern is repeated would not be an option, as the unavoidable tempo drift of the new section, even when marginally different from the first, would prevent the kicks lining-up as required.

However, the success of both of these kick-quantisation and kick-building methods will often be heavily impacted on by the resulting 'flams' caused by the difference of the kick-drum spot mics that have been quantised, or the placed samples, and the bleed-over of the kick drums on the overhead mics which have not been quantised or 'built'. These 'flams' can often have the effect of making the kick drum performance sound inaccurate, and impact on how tightly synchronised the kick drums, guitar and bass are perceived to be.

Techniques can be employed during the tracking stage to remove or minimise kick bleed and the possibility of these flams becoming a problem;

- Producer Ron Vento from Nightsky Studios uses blankets or something similar to cover the outside of the kick drum to stop as much kick drum bleeding onto the other mics as possible. (Tape Op. 2009, p.14)
- The drummer can be asked to simply stop playing on particular sections where the kick work will need to be built from scratch, thereby removing kick-bleed completely. This technique works well, but in many instances will be confusing for the drummer, who simply will not be used to playing without using their feet, which in turn can cause them to lose the groove and feel of the section with their hand-work.
- A solution to this problem can be provided by packing the kick drums with additional pillows and blankets and pushing this right up against the batter head, so that the only noise that the bass drum makes is the slap of the beater hitting the head, but with no weight or resonance. This minimisation of sound level being emitted from the kick drums will be enough so that the kick bleed-over on the overheads becomes irrelevant.

## **The Producer as Performer**

Although in other genres a producer will frequently be involved in some aspects of the composition and the arrangement of certain songs, it is usually only the arrangement aspect that would have any relevance to a producer working in the extreme metal genre.

However, the knowledge and experience required to carry out these various editing, quantisation and kick-building techniques can be viewed as a specific skill that producer's in the extreme metal genre need to develop. With this in mind, the producer could be viewed as performer, particularly when it comes to effectively and convincingly building the kick performance with samples.

Similarly, when the production involves a significant degree of these techniques, then due to the level that the drum performance will have been scrutinised and put under the

studio 'audio-microscope', this can be viewed as the blueprint for the live version of the songs, particularly from a tightness and accuracy of performance perspective.

Clearly, questions can be raised as to the ability of some drummers to reach this standard of live performance when their standard in the studio was far removed from that required.

## **Case Study – Kaizen**

As a case study regarding the issues already discussed, Kaizen's sophomore album, produced by the first author of this paper, will be used.

In the instance of the production of this album, it was unfortunately not possible for the producer to join the band in their rehearsal room for pre-production, as the budget was not sufficient to allow for the return flight to Paris from Manchester. For this reason, the pre-production that was carried out with the band was done with demo recordings via email.

One of the first points of discussion with the band was the performance and production on their debut album 'Clear the Path'. In the first author's and producer's opinion, the drum performance in particular and the standard production overall was nowhere near tight or professional enough, and sounded more like a good quality demo than an album being released through Sony.

Due to the numerous benefits to using a click track as presented here, this subject was therefore right at the top of the pre-production priority list. As the band had agreed with the comments provided to them regarding the areas that their debut album was lacking, they agreed to start mapping out the tempos of the songs for the album, and to have their drummer practicing to this as soon as possible.

The band went about this by firstly programming the drum parts into a drum-machine and fine tuning the tempos, with a degree of tempo-mapping, until the perfect groove (particularly for the rhythmically challenging guitar parts) for each section was reached.

The rest of the band then recorded their respective parts to the drum machine and these recordings were MP3'd and mailed to the author.

On analysing these, it was immediately apparent how much more complex the drum patterns and guitar parts were than as displayed on their first album. This was particularly the case with the double-bass drums, which not only featured particularly fast subdivisions and sections, often sustained over long periods of time, but the fact that these were often synchronised with the guitar riffs, which frequently 'locked-in' and played the same rhythm as the kick drums.

On the first day of drum tracking in the studio, after spending a full day on mic positions getting the tone required, the clinical 'aural microscope' which is provided by the studio environment, confirmed the producer's fears regarding the drummer's abilities to perform the particularly complex bass drum parts accurately.

Unfortunately, the difference between the kick parts as being performed when tracking and the parts as heard when programmed was great enough that the options of using playlists, copying and pasting good sections, or using 'elastic-time' for quantisation was not possible or was not appropriate.

For these reasons, the adopted approach was to record the drum tracks with the kick drums completely packed and dampened and then to 'build' the kick performance with samples. Due to the time efficiency and accuracy benefits of a grid reference when building these kick patterns due to a click track being used, time was able to be spent providing the kick-patterns with a human feel.

## **Authenticity**

Building kick-patterns in this manner, so that it is not only effective, but perceived as authentic and natural enough to convince the listener that it has been performed as part of the drum recording, is an art in itself and this takes skill and experience to achieve this.

Authenticity is discussed in Allan Moore's "Authenticity as Authentication," where he speaks of authenticity of expression arising when '...an originator (composer, performer) succeeds in conveying the impression that his/her utterance is one of integrity, that it represents an attempt to communicate in an unmediated form with an audience' (Moore, 2002, p.214). Moore also discusses authenticity of execution '...this arises when the performer succeeds in conveying the impression of accurately representing the ideas of another, embedded within a tradition of performance' (Moore, 2002, p.218).

This sense of authenticity, reflecting realness and credibility is an essential concept for fans of metal music, where ideals such as manufactured bands and auto-tune are the anti-thesis to closely held principles for fans of genre.

It is doubtless that most producers would prefer a scenario where the drum parts are performed live with the necessary accuracy. Clearly, a more organic, more natural overall production would likely to be created, with considerably less time spent on any slight edits required. However, in the scenario outlined above, this was the most appropriate solution to actually getting the album completed on time, within budget, with a strong standard of production.

## **Consistency**

In the event of mixing a project for this genre where purely an acoustically recorded kick drum performance source is used, this would usually be heavily compressed in a bid to achieve the desired level of dynamic consistency.

In most instances, when replacing acoustically recorded kick drums with samples, between one and three samples would be lined up and used simultaneously (perhaps with one providing the weight and another more of the attack, for example), but without any change in dynamics on each track. This is to provide consistency and power to the mix. In this instance, the five Physical Dimensions and the Perceived Parameters of Sound, as highlighted by William Moylan, which are frequency, amplitude, time, timbre and space (Moylan, 2002), become largely consistent. This consistency of bass drum dynamics and tonality is very important for helping provide the overall weight and power

to the mix. This is an essential principle for a high quality of production for this genre.

Even In the instance of utilising samples to reinforce, rather than replace, this will still contribute to the dynamic and tonal consistency of the kick drum. The degree to which would be dependent on the percentage of volume contribution the sample has in comparison to the acoustic source when they are combined.

## **Conclusion**

It is important that click tracks are used for pre-production and tracking of the drums for this genre of production. The use of a click track provides an essential central reference point in forcing a drummer to tighten up his beats and parts and allows the producer to accurately assess as such. This enables a precise standard of drum performance. Additionally this enables the more effective, easier and more efficient use of the five outlined quantisation/editing/kick-building techniques, which, when appropriate, can be used to create a high standard of kick drum performance most effectively. Precision of performance, particularly concerning kick drums, is at the core of the very nature of a high quality extreme metal production.

If click-tracks are used, then these numerous drum editing and kick-building techniques in combination with the use of drum samples can be seen as contradictory to the following statement from Stanley Alten;

(you) cannot change a mediocre performance into a good one, compensate for poor microphone technique, or make a sloppy recording precise. In most instances it is the quality of the recording session that determines the overall quality of the mix.

(Alten, 2002, p. 421)

When producing bands in this style of music, the most suitable approach to provide the pre-requisite ethics of precision, accuracy and tightness should be given priority over the reality of the drum performance event.

In the instance of an extreme metal album production where a considerable level of the kick drum patterns are relatively fast and complex, but a vast quantity of the



performances in question are significantly far enough away from the levels of precision and tightness required, then it is appropriate to completely disregard the drummers footwork performance, to the extent of not actually recording the kick drums with spot mics. This was the chosen route when producing the Kaizen album 'Sink'. By taking steps to either remove or heavily minimise any acoustic kick-drum bleed onto the other mics (particularly the overheads), then kick-patterns can be built with an appropriate sample, without flams impacting on the production.

With all of the above in mind, it can be proposed that without the use of a click-track, the production quality of Kaizen's 'Sink' album, would have suffered considerably.

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Kaizen. 2005. '*Sink*' XIII Records/Sony

## Item 2



# **Journal on the Art of Record Production**

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**Sound At Source:  
The Creative Practice Of Re-Heading, Dampening  
And Drum Tuning For The Contemporary Metal Genre**

**Mark Mynett**

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**Introduction**

For any serious recording, the starting point and foundation to capturing a great drum sound should always be the same, regardless of the studio's acoustic or equipment specifications: acquire the drum sound you are striving to capture at source, before miking up begins.

This paper begins with an analysis of the physical attributes and construction of drum shells, their components and suspension system, and considers the impact that this has on the resulting timbre, and getting the sound right at source. It is fortunate that the physical elements of a drum that has the most influence on the resulting sound are the ones over which we have most control – the drumheads. They produce the drum tone itself, and the manner in which the two heads are tuned, and therefore interact, has a highly significant impact on the drums attack and sustain. Drum tuning, in combination with re-heading and dampening, should therefore be at the foundation of obtaining the sound you are striving to capture at source.

The most appropriate approaches and principles for achieving the right tonality at source for performance and production within the contemporary metal genre will be discussed. This style will usually display a different design ethos when compared to

others with similar instrumentation. This is partly due to the down tuned nature of the bass and guitar and the sonic 'heaviness' and weight required of the production. Additionally, there is a particular emphasis on definition and intelligibility, which is essential for retaining clarity for the often complex, virtuoso performances.

## **Sound At Source: Drum Shells, Their Components And The Suspension System**

With the exception of the human voice, the drums are the world's oldest instrument (Schroedl, 2002 p.58).

Geometrically, a drum is a hollow, enclosed cylinder...but there's so much more to it than that. Its character is defined by the shell and heads, the materials and construction of which affect sound and performance (Modern Drummer 2008, p.162).

Although timbre and tone are related, they are quite different things. Tone can be thought of as the type of equalisation changes (bass, mid, treble, etc.) you can make on a guitar amplifier, for example. Whereas timbre can be looked at as the colour or the nature of a sound, which relates to the harmonics and their relative intensities, which thereby determine an instrument's characteristic sound. (Huber and Runstein 2010, p.56) For the aural characteristics of drums, we can consider the inherent qualities of the drum shell (i.e. its materials, construction, components and suspension system – all of which affects the way the shell vibrates) as being the timbre-producing element. This can be contrasted with the heads and the tuning of the heads as being the tone-producing components.

With the physical construction of drum shells, the diameter of the shell determines the pitch of the drum, while the depth influences articulation and resonance, with the longer the drum, the shorter the sustain (Modern Drummer 2008, p.167). In both respects, as Gatzen (2006) points out, the key to good timbre is the shells symmetry and flatness of the bearing edge. Good symmetry to a drum shell will ensure that a drumhead can be put onto the shell and rotated freely without any binding occurring. If a shell is slightly egg shaped, known as being 'out of round', then the drum will not tune, and unfortunately there is no way to correct this. This can be checked by taking off the

drumheads and using a tape measure to check consistency of measurement across the drum all the way around. Variations of an eighth of an inch or more will mean that the shell can be considered 'out-of-round' meaning that consistency of tuning can never be achieved, however, within one sixteenth of an inch out of round is considered as being acceptable.

As Schroedl (2002, p.16) points out, the condition of the shell's bearing edges is similarly essential. The bearing edge is either end of the cylindrical drum shell, the only point at which the drumhead touches the shell. "The head must evenly meet the shell all the way around, and a great deal of precision is involved in creating the bearing edge so the head can sit perfectly" (Modern Drummer 2008, p.169).

If there are divets or raised areas present, then the drumhead will not resonate correctly, usually resulting in a vastly inferior sound, regardless of the genre of music being performed. A shell's bearing edge can be checked by placing it on a formica top and rocking the shell from several points. If there is any significant movement, due to a gap that exceeds three pieces of paper (ten thousandths of an inch to each sheet of paper), then the bearing edge cannot be considered as flat and the drum will prove very difficult to tune and hold its tuning. Additionally, as Schroedl points out, a light can be shone inside the shell to see if any light escapes between the shell and formica, evidencing nicks, divots or rough spots if this is the case (2002, p.23). However, in contrast to when a shell is 'out-of-round', an experienced craftsman can re-cut the bearing edges to correct most of these problems (Gatzen, 2006).

Concerning the shape of the bearing edge of drum shells, Eric J. Macauley states:

There are several bearing edge shapes which are currently used in drum production. It is expected that different bearing edges will have a significant affect on the sound of drums. One possible reason for the importance of bearing edges is that the edge is the primary outlet for energy to transfer between the drum head and the drum shell. (Macauley, 2003, p.1)

With regards to the merits of the various bearing edge shapes, Macauley suggests that when the point of contact is a double 45° bearing edge shape, which is in the middle of the drum shell, that the energy will remain within the drum shell, rather than leaking

out of the outside of the drum shell (Macauley, 2003, pp.6-7).

With the exception of snare drums, which are sometimes made of steel or brass, the vast majority of drum shells are made of birch or maple. However, the Yamaha 9000 kit, which is often considered to be the classic studio shell pack of choice, has a birch/mahogany/birch layering (referred to as composite). Other woods used for drum material include beech, oak, poplar, mahogany, basswood, ash and even exotic varieties like ebony and rosewood. However, birch and maple shells are certainly the most popular choice.

Birch gives a very lively, bright sound with a fairly even frequency response and bright overtones. Many producers associate birch drum kits with a very desirable drum tone for studio work, as they tend to sound very dense, controlled and focused. Maple produces a warmer, darker tone that emphasises low and low-mid frequencies to give much more of a loud, punchy and boomy sound, with a tendency to sound wetter and looser than drum shells made of birch. According to John Wood:

If you're trying to get longer sustain, of course we go to a maple drum. If you're wanting a punchier, better recording style drum, that's when we use birch. Maple has a long vibration, and birch vibrates very fast and short. (Wood quoted in Modern Drummer 2008, p. 163)

In the author's experience relating to the resonant frequencies of the shell, maple has higher fundamental pitch, with more mids and highs, whereas in comparison, birch has a lower fundamental pitch with a punchier overall timbre.

Composite kits usually have characteristics somewhere in between birch and maple, and usually have a relatively dead sound. Gatzen (2006) claims that, generally speaking, they are easier to tune than shell packs made of purely birch or maple. Interestingly, "It can be noted that many vintage kits were made of mixed wood shells" (Modern Drummer 2008, p.164).

From a timbre perspective, as to the more preferable construction material of drum shells for the contemporary metal genre, it is important to differentiate between the bass drum/toms and snare. For the bass drum and toms, the first consideration would be the



specific style of performance being tracked. For instance, fast double kick work (often performed on a single kick but with a double pedal) with fast subdivisions on the toms, it is likely that the denser, brighter, controlled and focused timbre of birch shells would be more appropriate than maple, which would have a tendency to sound darker, and warmer with boomy characteristics. This would be due to the birch shells enabling more clarity and definition to be captured for the fast subdivisions of the performance. However, with the relatively dead nature to the timbre of composite shells, these would also be well suited to capturing the attack characteristics of a performance with faster subdivisions. The darker, and more boomy timbre associated with a maple shell pack would be likely to inhibit the attack characteristics of the timbre, due to the sustain being less distinguishable from the attack.

To get an appropriate sound at source for snare drums for the metal genre, the focus will usually be weight and size, combined with the right attack. Weight and size can be considered as appropriate content in the suitable areas of the snares frequencies combined with a quality of overall timbre. In this respect, there is not any construction material that could be deemed most appropriate to the metal genre. A variety of wood and metal construction types (e.g. six lug snare drums have a coarser, darker tone than those with a higher number, due to the larger difference between these nodes) as well as dimensions and shell thicknesses can provide the right characteristics to ensure that this element cuts through the rest of the kit and the density of the overall mix.

In addition to the material that the drums are made of, the thickness of the shell will affect their sound considerably. Very simply, the thinner the shell, the more that it will vibrate. Gatzen (2006) says that shells that vibrate are generally considered as being  $\frac{5}{16}$ ths of an inch or less in thickness, and shells that vibrate less freely are generally considered as being  $\frac{5}{16}$ ths upwards. In the instance of shells that vibrate, these tend to be generally bright and edgy sounding with a lot of snap to the tone. They will support many head configurations and when tuned into the higher range can be very clear in pitch and very pure sounding. In contrast, the concept with shells that vibrate less freely is that they just support the heads, and therefore their tone is more dependent on the heads than a shell that vibrates. When tuned in the higher ranges, they do not have the pitch clarity that the thinner shells would have when tuned similarly, however, they have a tendency to sound dense and fat with a rounded tone when the tuning range is quite

low.

When considering the context of the down-tuned instrumentation in which the drum sounds would be heard, attack combined with weight and size is required of the kick and toms for the contemporary metal genre. As will be discussed later in this paper, this is more likely to be provided by having the kick and toms tuned in the lower ranges while keeping the drum sustain tight to emphasise the attack. Although it could be stated, therefore, that shells that vibrate less freely would be more likely to provide these characteristics when tuned in the lower ranges, the experience of the author of this paper is that thinner shell packs, depending on their physical attributes and construction, can also provide the appropriate timbre for the contemporary metal genre.

However, to put this information about wood type, dimension and construction into context, Ray Ayotte, former president and designer for Taye and Ayotte states that “a drum shell is only responsible for about ten percent of a drum’s total sound, with the counter-hoop being influential but the drumhead producing most of the sound” (Ayotte in *Modern Drummer* 2008, p.164).

Generally, the more hardware attached to a drum shell, the less resonant it will be. Prior to the 80’s, the tom mount bracket was always attached to the shell, impacting on the resonance of the shell by impeding the vibrations of either one, or both, of the drumheads. The advent of RIMS mounts (resonance isolation mounting system) revolutionised drum suspension by taking mounting hardware off the shell, which eliminated a potentially large hole for a tom arm, leaving the shell more free to vibrate, with only the lugs remaining attached to the shell (*Modern Drummer* 2008, p.169). Gatzen (2006) says that the objective of a good suspension system is to alleviate effects on the timbre of the drum. This encourages head phasing, which relates to the synchronisation of the batter and resonator heads vibrations, which in turn provides an enhanced fundamental and improved sustain to the drum.

Using tension rods, which connect to the lugs, the drum hoop attaches the drumhead to the shell by holding it onto the shell’s bearing edges. The materials used, and manner of construction of the drum hoop, has a considerable effect on not only the sound, but also feel. Most drummers feel that flanged hoops (sometimes referred to as rolled

hoops) provide a better feel, due to the fact that drum hits are provided with an element of 'give', they have less attack than a die cast hoop. The improved definition and sharper attack provided by the construction of a die cast hoops means that they are favoured by many metal drummers, however, they provide less flexibility with a more brittle feel than a flanged hoop, and more precision is required when tuning.

Similarly the number of lugs on a drum has an effect on how the drum tunes and sounds. The fewer lugs there are, the coarser the tuning, and the more complex the overtones. This is due to the lengthened distance between the lugs, which results in a darker tone, as there are less high frequencies. As Schroedl says, many high-end snare drums will use as many as ten lugs (p.21).

## **Drumheads And Re-Heading**

Old heads do not sound focused and can produce unwanted ringing, they will not sound explosive enough to cut through a mix as well as new drum heads, which will produce more resonance and tone (Molenda, 2009). For a contemporary metal production project of any significance, new drumheads are a must. If the drum kit's batter heads are 'pitted' in any significant way, or have simply become unresponsive and lost their bounce due to the amount that they have been used, then they will not let the drums respond properly and will inevitably hinder the relevant drums tone, weight and clarity in the mix. The cost of new drumheads can be viewed as incidental compared to wasted time in the studio. This could, for example, be as a result of often-futile endeavours to tune the drums or achieve the right microphone placements. Or could perhaps be due to additional time spent on processing and manipulating the drum tracks when mixing, in an attempt to compensate for the sub-standard recording of the kit's shells.

Prior to re-heading, consideration needs to be given as to the make and type of drumhead to be used. As Schroedl points out, through drumhead choice, the drum's overall pitch (high or low), tone (dark, mellow or bright), sustain (length of resonance), and articulation (the attack when struck with a stick) is determined (p.10). The options to choose from include single ply or double ply, the head thickness, which is measured in mils (1/1000th of an inch), and whether you are opting for a coated or clear head.

Additionally there are often varieties in material, design or construction to choose between. The thickness of the ply affects the fundamental note, sensitivity, sustain, amount of attack, and durability. A single ply head has more sensitivity and more sustain than a double-ply head. However, for the metal genre's drum performances which are often fast and of a highly complex nature, a highly resonant kit can be a huge problem, not only in the studio, but also live. Due to their mass, double-ply heads vibrate slower than a single-ply, and will therefore have less sustain and more attack, providing a deadened, deeper tone combined with low-end punch and weight. Additionally, using double-ply heads will allow you to tune lower and will be more resistant to denting than a thin head (Schroedl, 2002, p.11). For these reasons, a thick, double-ply batter head can be considered more appropriate for the kick and toms of a drum kit being used for a contemporary metal performance than single ply. Regarding varieties in material and construction of double-ply heads, Scott Schroedl points out:

Two-ply heads come in two varieties; both types use two pieces of mylar, but on one type the outer inch or so is glued together, making its sound more muffled. These type of heads work best when tuned low (on bass drums and toms) – almost to the point of wrinkling.  
(2002, p.11)

As already mentioned, keeping the kick drums and toms tuned really low provides the type of tonal characteristics that are particularly well suited to the metal genre, so this particular design of two-ply head provides an excellent choice of batter head. Schroedl also says that:

Resonant heads for bass drums are one ply, but with some variations, such as a removable ring near the outer edge, or those that have dampening materials adhered to the head itself.  
(2002, p.14)

Some producers opt for the tonality of a bass drum without a resonator head. By doing so this facilitates very easy access from within the shell to position the microphone close to where the bass drum beater contacts the batter head, which is an optimum position for capturing the essential attack and 'clickiness' generally required of the genres kick drum tones. However, for obvious reasons, the absence of a resonator head results in the kick shell itself vibrating less, and therefore renders a kick drum with far less resonance, low-end, weight and punch as a result. In the author's experience, a kick

drum with a resonator head provides a much fuller tonality, with improved punch and weight than without, and if the head has a sound hole cut in it, this enables a double-miking technique which is highly effective for recording kick drums for the contemporary metal genre; firstly miking the contact area of the batter head from inside the shell to capture the attack, as described earlier, but combining this with the classic half-in/half out of the sound-hole mic technique (frequently with the ubiquitous AKG D112, or a Shure Beta 52), which will usually enable the essential low-end weight of the kick to be appropriately captured. This sound hole cut into the resonator head also helps alleviate beater bounce-back, which can impede a drummer's footwork performance. Schroeder says that this sometimes occurs when air inside a kick drum cannot escape (2002, p.49). When cutting a sound hole in a bass drum resonator head, making as small a hole as possible will allow the resonator head to resonate as fully as possible and any more than about 6 inches will have the effect of turning the drum more towards a single head design. It is highly inadvisable to cut a sound hole in the centre of the head, as not only will this stop the resonator head resonating correctly. Additionally, the centre of a kick drum, which is usually overly boomy, should be avoided when miking the kick drum (Gatzen, 2006).

The resonator heads for toms are most commonly single-ply, for the reason that the use of double-ply heads for the resonator side results in very little clarity, with a 'choked' sustain that is more akin to a dull thud.

Snare drums need extremely thin resonator heads, which are manufactured expressly for this purpose. A thicker snare resonator head would produce less snare response. Gatzen (2006) points out that thin snare batter heads (2 mil) increase snare sensitivity, whereas thicker heads (3 mil) increase focus and are better for louder playing. Concerning the choice of clear or coated heads, nearly all drummers use coated snare drum batter heads. Coated heads give an obvious 'scratch' when played, which gives the snare tone a crisp edge. Additionally, the coating takes away some of the overtones and high-end harshness, which has the effect of subtly mellowing the sound. For these reasons, some drummers will opt to use them on their toms as well as snare, although this is relatively rare for drummers from the metal genre. Drum manufacturers have now developed snare batter heads with vent holes near the edge (e.g. the Evans 'Genera Dry' range). This has the effect of dampening any snare 'ring', thereby creating a 'drier'

sound.

As opposed to coated heads, clear heads bring out the high-pitched tones of the stick attack and resonance of the drum and are therefore brighter and clearer sounding with more volume and an enhanced harmonic range. These qualities mean that, in the author's experience, clear heads should be the choice for the vast majority of metal drummer's kick drum and toms.

During the seventies, dot-reinforced clear heads became popular, mainly due to their considerable durability. However, they created a slightly nasty overtone when struck, with a piercing mid-range, with many drummers feeling that they provided poor feel and response. For these reasons they are rarely used any more.

As stated previously, for a contemporary metal production project of any significance, new drumheads are a must. However, some producers make the mistake of presuming that the frequent use of drum samples for the production of the metal genre negates this sentiment. They fail to take into account that to retain dynamics and avoid a performance that, particularly during faster sub-divisions, sounds like a drum-machine (often referred to as 'machine-gunning'), it is most likely that samples will be used to reinforce the spot mics, rather than replace them. The only likely exception here could possibly be the kick, where very even dynamics are desirable and more akin to the performance itself, partly due to the fact that the kick drum(s) are the only element of the drum shells that are consistently struck in exactly the same place with every hit. Additionally, regardless of the manner in which drum samples are used, bleed-over onto the microphones used for the kits metalwork (invariably condenser mics) is inevitable, and will clearly therefore impact on the standard of the resulting drum sound.

Nevertheless, if the band or the project is on a really tight budget, then the area to save money on when re-heading, is to not re-skin the bass drum(s). As already mentioned, this is the part of the kit with the least dynamics required, and therefore the easiest and most effective element to utilise samples for.

If the budget is available, it is advisable to change not only the batter heads, but also the resonator heads. Many drummers make the mistake of thinking that because

resonator heads never get hit and never get dented therefore, that they last indefinitely. In reality, they lose their resilience and bounce due to the polyester film drying out, which will have a negative impact on drum tone. As stated by Schroedl, the bottom heads are one of the most overlooked and misunderstood parts of the drum tuning process (2002, p.36).

If possible, it is a good idea to get the drummer to change their heads, stretch them in and use them for just one rehearsal to properly bed them in prior to properly tuning the kit. After removing the old head, if required, then the shells lugs should be lubricated with a product such as WD-40. Following re-heading, if there are issues with the lugs holding their tension, then purpose made plastic retainers should be used to pack the lugs. If you do detect a rattle coming from a lug, you can quiet the noise by packing it. Schroedl says that the best way to do this is to wrap the spring with either felt or cotton cloth (2002, p.8). Clearly, this would involve removing the drumhead to carry this out. Although not strictly part of the re-heading process, this is often the right opportunity to also use a product such as WD-40 to lubricate the bass drum pedals chain mechanism and/or other relevant parts. Drum pedals that squeak can cause problems with a drum recording, as a microphone will quite easily pick this up.

## **Tuning**

Drum set tuning has been a frustrating process for many drummers over the years. There are about as many different tuning techniques as there are drummers. (Schroedl, 2002, p.8)

Tuning drums, particularly after re-heading, has always been a challenging and frustrating process for drummers, engineers and producers alike. With bass and guitar, for example, a single tuning mechanism (a machine head) is used, and a pre-established pitch is adhered to for each string. This will usually be carried out with the aid of an electronic tuner. Whereas with drum tuning, there are between five and ten tuning mechanisms (tension rods) per head, and the vast majority of drums will use two heads – a batter, as well as a resonator head. Although there are mechanisms available to assist with tuning drums, these are most frequently only used to get a drum tuned into the correct general area, and then fine-tuning is completed by ear. These mechanisms operate by providing a measurement of pressure reading at a specific distance from

each drum lug (for example the drum dial, which comes with a rough guide chart as to what tensions your batter and resonator head should be tuned to for different tom sizes) or by alternatively giving a tension reading of the lugs themselves (although these can be rendered inaccurate due to rusty, or sticky lugs). The reason that these implements are generally only used to get a drum tuned into the correct area, and then fine-tuning completed by ear, is that there are multiple and complex overtones associated with the overall pitch of a drum. It is not a given, therefore, that a drum would also present the optimum resonance, projection, pitch bend and tone simply because the batter and resonator head were tuned to what could be considered as an appropriate tension.

For these reasons, there is often a lack of understanding about the physical way in which a drum functions and many drummers, engineers and producers simply do not experiment and practice enough with re-heading, dampening and tuning. On top of this, there is relatively little information out there on this specific subject matter, particularly when compared to the wealth of academic literature on microphone choice and placement and recording and production in general.

When tuning drums, we are ultimately seeking to control and manipulate attack and sustain, as these are the two most important functions of a drum sound. Attack is the very first portion of the sound – the stick hitting the plastic. Attack is what the listener perceives most, and it is what we want to control most. Sustain is the period of time just after the attack period, not the length of the sound, the length of the sound is the decay. Whenever you increase the sustain of a drum, you decrease the attack characteristics (Gatzen, 2006). To properly manipulate the attack and sustain characteristics, drum tuning should firstly be carried out without any form of dampening. Schroedl says that drums should be tuned wide open and then dampened accordingly, if required (2002 p.44). Additionally, tune each drum away from the other drums and cymbals, as they will resonate when you hit the drum you are working on, clouding your pitch reference and making it more difficult to tune (Schroedl, 2002, p.61).

The head of the drum can be tapped about one inch from the hoop at each lug to hear the differences of pitch when tuning (Schroedl, 2002 p.28). A simple way to help you hear the pitch at each lug is to very gently touch the middle of the head with one finger whilst you are gently striking the head at each lug (Schroedl, 2002, p.29). An



often-used technique is to find the lug with the most pleasing tone and match the other lugs to it (Schroedl, 2002, p.28). However, when you want to establish the pitch of a drum, never hit it at the edges because the edges will have multiple pitches in them. As Gatzen (2006) points out, the edges of the head produces overtones, the centre is the fundamental, so hit the centre to get the fundamental. You should mute the head that you are not working on, so that you can hear only the one being tuned (Schroedl, 2002, p.31). Setting the drum on a towel to prevent the relevant head from vibrating can do this.

## **Bass Drums**

Due to the fact that there is only a very small tuning region where they will function properly, bass drums are usually the easiest drum to tune. The author's experience has lead to a preference for keeping the tuning of both heads really low. Often so low that the wrinkles of the drum head are only just about taken out, and certainly within a couple of turns of the lugs from when they are loosened off and just starting to grip when tightening. Bass drums can, however, be tuned too low, which result in tone quality and projection being lost. Obviously the drummers 'feel' of the kick drum needs consideration, with many drummers feeling that with a batter head that is tuned very low, they do not get the right response and bounce from their beaters when striking the kick's batter head.

In the author's experience, trying to tune a bass drum's batter or resonator tighter in order to try and gain click or attack has been far from successful, leading to a much greater sustain from the drum and additionally leading to a frequency response that will fail to provide a solid foundation to a contemporary metal production, due to a deficiency of low-end punch and weight. By tuning the batter and/or resonator head into the lower regions, the kick drums sustain will be shortened, therefore increasing the perception of the kick's attack.

When using a kit with double kick drums, it is advisable to tune one slightly different to the other to provide better differentiation between the two. To maximise the click and attack from the bass drum(s), it is best to use either hard composite or wooden beaters,

despite the fact they are very tough on drumheads, as they will provide far better definition than felt beaters. Additionally, the use of an adhesive slam patch, on the area of the batter head where the beater strikes, is highly beneficial in maximising click and attack. Danmar pads are probably the most well known and widely used, and will often come included with a new bass drum head. Super-gluing the likes of two pence pieces or credit cards to the kick drum batter head as a substitute should be avoided, as these are far less effective than a purpose made product.

Bass drums should be mounted as evenly as possible, front to back from the floor, as possible. The more you tilt the bass drum back, which some players will do for feel purposes, the more you put pressure on the front rim, which has a negative impact on the drum's timbre. (Gatzen, 2006)

## **Snare**

The snare is the signature drum of the drum set and the most identifiable. It sets the tone of the drum set (Gatzen, 2006). Compared to the toms, the snare has a much higher tuning, with very different thicknesses to the batter and resonator heads. Unless a snare is particularly deep shelled then they can be tuned to extreme tension and high pitches without choking the drum (Salz, 2003). Problems with snare drums will usually emanate from the bottom head and the snare wires, which are the tone generator and tone control. Regarding the tension of the snare resonator head, Schroedl feels that by pressing on the snares resonator head close to the middle, the reflection of the snare wires on the drumhead should span about three inches on a standard 14" diameter snare drum (2002, p.43). Gatzen (2006) says that due to the fact that the snare wires can muffle and choke the tone of the drum, getting them to vibrate freely and evenly is the objective. Thomas D. Rossing states that:

For the snares to sound at all requires a certain amplitude of the snare head. This critical amplitude increases with the snare tension. The snare tension is optimum when both the head are moving at maximum speed in opposite directions at the moment of contact. In this case, the impact (and the radiated sound) is the greatest. (Rossing, 2000, p. 33)

On this subject, Miller (2004) says that if you are hitting your drum at lower dynamics

and it sounds like a tom, then your snares are way too tight. To test the snare sensitivity, have the snares on, play very softly in the center of the batter head, and if they rattle too much you'll need to tighten them up (Schroedl, 2002, p.44).

Snare drums are generally tuned higher than the toms, will have a shorter sustain due to the higher tuning and with more of a pitch the higher they are tuned (Schroedl, 2002, p.41). Concerning general principles for the tuning of snare drums, there are numerous guidelines and approaches that can be experimented with. Gatzen (2006) feels that by tuning the resonator head to a 'G', and then tuning the batter head higher than the resonator head by an interval of a third will result in a 'woody' sound, whereas an interval of a fourth or a fifth will result in a more metallic sound. However, similar to the lack of snare drum construction material, type, dimension or shell thickness that could specifically be deemed most appropriate to the metal genre, similarly there are not any approaches to the tuning of the snare that could be deemed most appropriate. A cursory listen through a number of high standard contemporary metal albums will likely exhibit a relatively wide variation of snare tonalities from a tuning perspective. An example of this could be a comparison of the snare tone on the Isis album '*Panopticon*' (2004) and the Lamb of God album '*Sacrament*' (2006). The Isis snare appears to have had a relatively tight tuning, with minimal, or no form of dampening applied whatsoever, with the snare wires having a minimal impact on the sound (possibly with no snare bottom mic used), leading to a very open tone with a lot of ring and sustain. Comparatively, the Lamb of God snare would have had a very different tuning and dampening applied. Here, there is a lot of weight to the snare, most probably as a result of a lower tuning, and features a very tight sustain and 'spitiness' of attack, most likely as a result of the snare wires having a lot more impact than with the Isis example. Both of these snare drums work within the mix in their own way, but feature entirely different tuning and dampening techniques. This shows that, whereas with the rest of the shell pack a tuning region can be deemed most appropriate (i.e. in the very low regions) there is no equivalent principle(s) regarding an appropriate tuning range or tuning approaches for snare. Although the greatly differing tunings for the snare could be attributed to the differing drum performance characteristics of these two acts, it is interesting to note that the kick and tom tones on these productions are relatively similar in comparison.

## Toms

A lot of metal drummers will make the mistake of trying to get their toms to resonate and sustain as much as possible with maximum volume, thinking that the projection that this provides will allow the toms to cut through the density of the mix. Although this is relatively easily achieved, by simply tuning the batter and resonator heads to a very similar tension to each other, a highly resonant kit, as already mentioned, can cause serious problems for producers of the genre, where keeping tones tight and well defined is essential. In contrast, tuning the batter and resonator heads to a very similar tension to each other, by tuning a tom's batter head tighter than the resonator head, not only is a deeper, rounder sound achieved, but also a tonally pleasing pitch bend. Alternatively, by tuning a tom's resonator head higher than the batter head, an equally pleasing pitch bend is achieved, but with a tighter sound, with better attack and shorter sustain. As Gatzen (2006) says, striking the toms relatively gently will enable the subtleties in the tuning to be heard and as Schroedl points out:

If the top and bottom heads are too different in pitch in relation to each other, the low-end sustain will come in late, with a slight delay between the occurrence of the attack sound and the occurrence of the sustain. (2002, p.31)

Similar to the kick, keeping the toms tuned very low will enable a more powerful tone with increased low end. Additionally, a pleasing pitch bend is more likely to appear in the lower tuning ranges and will result in a much shorter sustain than otherwise, which is usually advantageous when recording the type of fast, complex, performance — which is frequently a feature of modern metal. This is due to the fact that a shorter sustain time will increase the perception of a tom's attack, thereby assisting with clarity and definition. However, as Miller (2004) says, there are limitations, as if the toms are super dead sounding it is not going to cut through the music. On completing the individual tuning of all the toms, Schroedl points out that you should make sure that when the toms are played collectively, that the tuning between them results in pleasing and comparable intervals with similar sustain qualities (2002, p.35).

When the snare and toms are tuned, it is good practice to use lug locks to prevent the tension rods loosening up from the vibrations of the drum being struck. It is usually the

snare drum's tension rods that have a tendency to do this.

## **Dampening**

Generally, it is preferable to tune out any unwanted rings or resonances rather than dampen the drum to do this. This is due to the fact that dampening a drumhead not only muffles the sound, but also dulls the high frequencies (Schroedl, 2002, p.60). However, failing to use dampening is not always practical, or not possible as in the instance of the kick drum, which will usually be the shell requiring the most dampening. Gatzen (2006) claims additionally that lower drum tunings, which are appropriate for the metal genres kick and toms, usually require a degree of muffling to prevent the drum tone from becoming too sloppy.

## **Kick Drum**

Even though bass drum heads with built in dampening can be used, additional dampening will usually be required to achieve the kind of dry, dead, bass drum tonality that is appropriate for the contemporary metal genre. Pillows, towels, foam etc. can be used, however more attack and less woofiness from the drum can be gained by having a dampener on the batter head that bounces away from the head when it is struck, thereby enabling an enhanced shell vibration. A custom made product, such as a manufactured bass drum pillow that is attached to the inside of the kick drum shell with Velcro, will usually be the best approach.

Resonator heads will often need to be dampened, in addition to the batter, or they will sometimes display unwanted resonances, which can detract from the fundamental pitch of the kick drum. Muffling the resonator will lower the overall pitch of the bass drum (Gatzen, 2006), which is beneficial for a recording of a performance for this genre. The design of these previously mentioned manufactured bass drum pillows means that you can use one against the resonator head, as well as the batter.

## **Snare And Tom**

One of the poorest approaches to dampening the snare (or any other drum) is to use gaffer tape. Other than the fact that it is not easily adjustable and will leave a sticky residue, or damage the snare coating when attempting to adjust it, gaffer tape has a tendency to vibrate, which can easily be picked up by the spot mics. Although many drummers use dampening rings or external clip-on dampeners, the author's preference is for the purpose built product moongel, which is easily adjustable, re-useable and can be cut in half. Schroedl (2002, p.44) claims that in practice, internal built-in dampeners for snare drums are usually problematic, as they tend to throw the snare of tune, due to the way that they press up against the inside of the batter head.

## **Conclusions**

It is important to acquire the drum sound you are striving to capture at source, before miking up begins. Although a drum shells material, construction, components and suspension system have a considerable bearing on the drum's timbre, fortunately, the physical elements of a drum that has the most impact on the resulting sound are the ones over which we have most control – the drumheads. Despite the widespread use of drum samples for the contemporary metal genre's production, for a project of any significance, new drumheads are a must. Two-ply clear batter heads will normally prove most appropriate for the kick drum and toms, with single ply for the resonator heads. Wooden or composite beaters combined with a slam patch on the batter head will help maximise the kick drum's attack, which is essential for this style. A highly resonant drum kit can cause serious problems for producers of contemporary metal, where keeping drum tones tight and well defined is essential. Tuning the shell's batter and resonator heads to a very similar tension to each other, which provides the most resonance and sustain, should therefore be avoided. By tuning a tom's resonator head higher than the batter head, a tighter sound, with better attack and shorter sustain is achieved. By tuning a tom's batter head tighter than the resonator head, a deep and round sound is achieved. It is most appropriate for the bass drum and toms to be tuned very low in order to achieve the enhanced low-end weight and punch required of the genres drum tones, and to maximise the perception of the shell's attack due to the shorter sustain achieved by tuning low. Additionally this low tuning range will allow for a pleasing pitch band to the

toms. However, the drummer's feel of the relevant drum when performing needs consideration, and an element of dampening for the toms will often be required with low tunings, in addition to the usually heavy dampening of the kick drum. There are a wide variety of snare drum tones and tunings used for contemporary metal production. This means that there is not any sound at source tuning techniques, approaches or principles that can be deemed specific to snare tones for the genre.

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## **Item 3**



# **Journal on the Art of Record Production**

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## **Achieving Intelligibility Whilst Maintaining Heaviness When Producing Contemporary Metal Music**

**Mark Mynett**

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### **1. Introduction**

Metal is part of the Westernised, commercial pop and rock music industry that has imposed itself on the rest of the world... metal has played and continues to play a key role in the globalised entertainment industries.  
(Hill and Spracklen, 2010, p.vii)

The term 'heavy metal' was first used as an adjective relating to popular music in the late 1960s, however in the early 1970s the expression began to be employed as a noun and therefore as a descriptor for a music genre (Walser, 1993, p.7). Heavy metal has therefore existed for approximately four decades. In the past five years there has been a dramatic increase in academics researching and studying the area (Scott and Von Helden, 2010, p.ix). This is evidenced by the world's first scholarly conference on the metal genre, 'Heavy Fundametalisms – Music, Metal and Politics', being held in Salzburg, Austria in 2008 (Sheppard, 2008). To date, the focus of this academic study has tended to address the importance and relevance of metal from a historical, sociological, cultural, musicological and political science perspective (e.g. Weinstein, 1991; Walser, 1993; McIver, 2000, 2002, 2005; Kahn-Harris, 2007) and additionally, Weinstein points to metal studies comprehending the fields of economics, literature, communications and social psychology (Weinstein, 2011, p.243). In contrast, this paper focuses on the specific approaches and techniques involved in music production for this style and builds on the author's previous work in the area.

## **2. Fragmentation**

Following the emergence of heavy metal music in the early 1970s, the 1980s witnessed its ascent in popularity and success. This continued throughout the decade with heavy metal becoming one of America's foremost forms of popular music, for example (Walser, 1993, p.3); however, this period was also marked by the process of heavy metals fragmentation, which reached its culmination in the 1990s (Kahn-Harris, 2007, p.2). This fragmentation took the form of the music evolving, dividing and multiplying into numerous subgenres. These subgenres include, but are not restricted to: speed/thrash metal, doom metal, death metal, rap metal, neo-classical metal, nu-metal, black metal, hardcore metal, grindcore, industrial metal, progressive metal, post-metal, gothic metal and symphonic metal. The differences between these subgenres, although sometimes subtle, tend to revolve around song tempi, drumming technique, overall instrumentation, song structure, level and manner of guitar and bass down-tunings, rhythm and lead guitar playing techniques, lyrical content and vocal approach (Moynihan and Söderlind, 1998; Purcell, 2003; Mudrian, 2004; Kahn-Harris, 2007).

However, attempting to set out the musical parameters of metal music is highly problematic (Shuker, 2005, p.132), as metal embraces a wide range of musical influences (Walser, 1993, pp.3-4). Similarly, any attempt to provide a specific scheme of classification for any of metal music's multiple subgenres also presents numerous challenges (Berger, 1999b, p.56; Azevedo, 2010, p.322). Therefore, to avoid any possible debate about the accuracy of their application, this paper will avoid the use of specific subgenre designators. Additionally, the broader term heavy metal will be avoided. This is for the reason that, in recent years, this term has been adopted as a way of describing bands that perform a mode of metal music whose performance and artistic approach is similar to that heard before metal music evolved and hybridised into these numerous subgenres.

## **3. Contemporary Metal**

The collective, generic term contemporary metal (CM) will be used. CM is a term sometimes used by metal studies academics (e.g. Rafalovich and Schneider, 2005;

Rafalovich, 2006; Brown, 2007, 2011) and the metal music media to collectively differentiate bands demonstrating qualities associated with metal music's subgenres, rather than those qualities employed for traditional heavy metal. Roy Shuker (2005) uses the term contemporary heavy metal in his 'Popular Music: The Key Concepts' publication, which presents a glossary of the main terms and concepts used in the study of popular music. Referring to the multiple subgenres that resulted from metal music's fragmentation and hybridisation, and equating CM with these, Shuker proposes:

There are a number of identifiable heavy metal subgenres, or closely related styles. Although these are historically specific, each has continued to be represented in the complex range of contemporary heavy metal.  
(Shuker, 2005, p.133)

## **4. Defining Attributes Of CM Production**

CM artists will often explore different dynamics, styles and expressions within one song (Hoffstaf and Nagenborg, 2010, p.41). Despite this, the defining features of a high commercial standard of production are firstly heaviness and sonic weight, and secondly a high level of definition and intelligibility of the instrumentation involved, which is fundamental to retaining, and providing, sonic clarity for the often-complex performances and advanced standards of musicianship. These characteristics could be considered as being part of the style's unspoken aesthetic code.

## **5. Performance Attributes**

For CM, the standard of drum performances are frequently, but not always, technically complex, virtuoso performances, which are often marked by an intricacy and aggression of the beats, patterns and subdivisions employed, and the speed and stamina of the double bass drum work involved. These complex double bass drum subdivisions have a tendency to accentuate, syncopate or synchronise with the rhythm patterns of the guitar performances (Turner, 2009, p.6), which have an inclination to revolve more around rhythm than melody. This is highly effective in providing CM's sense of intensity, density, and heaviness. However these qualities present numerous challenges to retaining definition and intelligibility, which is fundamental to presenting a

high level of sonic clarity for these often-complex performances.

## **6. Down Tuning And Heaviness**

Heaviness is the defining feature of the genre (Berger and Fales, 2005, p.181).

In addition to a distinct intensification of the energy levels, aggression, complexity, intensity and general standard of performance displayed when compared to traditional modes of metal, there has additionally been a marked increase in the heaviness of bass and guitar tones involved with CM. This is normally facilitated by the now widespread use of down tuning, also known as dropped tuning, which is a term used to describe a musical instrument deliberately tuned with a lowered system of pitches. Pitch can be seen as vital to the overall sonic impact of metal, and down tuning provides a deeper, heavier and darker tonality. Furthermore, a greater movement of air is created from loudspeakers reproducing these amplified tones, due to the lower fundamental frequency. Due to the fundamental of a down tuned bass residing below the range of most domestic hi-fi systems, and the rhythm guitars occupying the range normally occupied by the bass drum and bass guitar, this causes several challenges to achieving a heavy, yet tight and controlled low end, that retains bass and rhythm guitar note definition and clarity.

Additionally, CM guitar tones have been impacted by the development of high gain valve amplification technology, which are better suited to the lower pitch of the tonalities involved. This provides the ability for musicians and producers to achieve significantly heavier and denser rhythm guitar tones. Additionally, in striving for a heavy, dense sound, CM rhythm guitar tones have a tendency to be 'quad-tracked', which in this instance, refers to CM's rhythm guitar sound often consisting of four separate performances. In context of the overall production, these highly distorted, down tuned and dense guitar tones provide numerous challenges to gaining the appropriate weight, as well as clarity and intelligibility, of the drums and bass guitar.

## 7. Heaviness

### 7.1 Frequency Content

Although the term can be used to refer to a wide range of instrumental timbres (Berger and Fales, 2005, p.187), for popular music purposes, the term 'heavy' is most frequently associated with the metal genre (Reyes, 2008, p.3). The adjective is mainly used to depict the sonic weight and density of the low and low-mid frequencies displayed by acts from this style. Appropriately controlling and sculpting these low-end frequencies is the principal challenge when producing the genre (Sneap, 2009) and it can be noted that the lowered pitches involved with the use of down tuning provides an extended low frequency content when compared to standard A440 tuning.

However, to restrict the focus of the concept of 'heaviness' to the low and low-mid frequency ranges alone would be a mistake. The upper mid range, as well as treble and presence range, are essential for achieving a thick, sharp and aggressive overall tonality from much of the instrumentation involved, and this tonality can contribute considerably to the perception of heaviness. This premise particularly applies to distorted guitar timbres, which are most commonly associated with the concept of 'heaviness' (Walser, 1993, p.2; Berger, 1999b, p.58). One of the results of Berger and Fales' study demonstrated that guitar timbres are perceived as heavier when more high frequency energy is introduced (Berger and Fales, 2005, pp.193-194). However, Zagorski-Thomas' review of this text highlighted that changes in mastering technology and techniques could also account for these changes (Zagorski-Thomas, 2007, p.695).

Similar to the introduction of more high frequency energy with more modern guitar sounds, CM bass drum sounds also have a tendency towards containing a lot more high frequency content than displayed in traditional metal. This is particularly so when compared to most other styles of rock music with similar instrumentation. This high frequency content for the genre's bass drums is often referred to as 'clickiness' and of all the drum kit's constituent parts, the bass drums on productions from the genre will normally bear the least resemblance to the natural acoustic properties of the source.

Clearly, bass guitar tonalities have a considerable bearing on a productions' sense of

heaviness, and these can be viewed as being heavy when their impact gives the sense of having weight, size and depth. However, one of the challenges created by dense layers of down tuned distorted guitars is getting the rhythm guitar and bass to sit together 'frequency-content' wise. Rhythm guitars are generally considered as needing to occupy the mid-range, however here, the down tuned guitars have a fundamental frequency that is occupying the area normally allocated to the bass drum and bass guitar. Therefore, it can often be the case that bass sounds which ordinarily, in isolation, embody the qualities of weight, size and depth will not work within the context of the rhythm guitars, and therefore the mix overall. Additionally, the fundamental frequencies of down tuned bass guitars are not usually recreated efficiently by most domestic playback systems. This is due to the loudspeaker excursion required to generate this region of frequencies being beyond the frequency range capabilities of the majority of mass produced consumer loudspeakers.

## **7.2 Frequency Content And Masking**

From a mix perspective, in striving for a 'heavy' result, many producers will excessively amplify incorrect low-end frequencies, resulting in an uncontrolled, boomy and flabby mix. Alternatively, a mix with a deficiency of the correct bass frequencies will sound thin and lack impact. The foundation to getting the heaviness of a CM mix right is by creating a very specific place and space for each sound source to sit and breathe. This will partly be achieved by avoiding frequency masking, which is an important sonic phenomena when mixing CM. In simple terms, masking is the ability of frequencies of one sound to obscure, or inhibit, (i.e. mask) the frequencies of another sound. From a mixing perspective, this equates to combining two or more instruments containing similar frequencies. These effectively fight for the same sonic space, with the quieter or weaker of these sounds having this range of frequencies obscured or made inaudible by the louder or more dominant one (Izhaki, 2007). Avoiding masking in a mix is a fundamental aspect of heaviness and perceived loudness, due to the fact that this phenomenon especially occurs in a dense mix, and is more pronounced in low frequencies. As stated, avoiding masking can be achieved by creating a very specific place and space for each sound source to sit and breathe.



### 7.3 Density Of Sounds

In addition to capturing and presenting the most appropriate frequency content for the instrumentation involved, the density of these sounds, particularly the bass drum, bass and rhythm guitar, is an essential contributing factor in providing a production that is perceived as being sonically 'heavy'. The principal consideration concerning frequency content and density of sounds is ensuring that the most appropriate sound is captured at source. This will involve the most suitable equipment being used, the tuning of the drums, microphone placement etc. etc.

However, other than these considerations, the foremost production technique for providing density is by means of the layering of sounds, which will strengthen the coverage of frequencies. In the instance of the bass drums, the use of sample reinforcement/augmentation, or replacement, is often employed. Here, an appropriate bass drum sample, which will have been created from a very hard strike to a bass drum, with no bleed, and already equalised, or alternatively already consisting of layers of these bass drum hits mixed together, will normally be used, and at a fixed dynamic range. In the instance of bass guitar, alternative tones are frequently used to supplement the regular combination of DI (direct injection) combined with microphone. This could, for example, involve the use of amplifier/cabinet/microphone software or hardware emulation, or/and the introduction of a heavily distorted bass signal.

In addition to down tuning, the concept of quad tracking is frequently employed to achieve a dense, heavy rhythm guitar sound. Quad tracking, in this instance, refers to the genre's rhythm guitar sound often consisting of four separate performances. In the instance of a band line-up consisting of one guitarist, this would usually involve this member recording the exact same rhythm guitar performance on four separate occasions. In the instance of a two-guitar band line-up, this would usually involve each guitarist recording his or her own exact same rhythm guitar parts on two separate occasions. When performed accurately, this technique results in a thicker, and sonically heavier guitar sound. Whilst layering rhythm guitars in this manner, it is beneficial to vary the tones between these four performances by changing an element, or elements, of the guitar equipment, microphone(s) or microphone placement(s) used. This will normally provide enhanced frequency coverage and an even stronger, denser and heavier guitar

tone than would be the case with four rhythm performances using the same sound. Two of these rhythm performances will usually be panned hard left, or perhaps with one of these parts not quite hard left, and two panned hard right, or perhaps with one of these parts not quite hard right. Although it would be hard to argue that stereo placement contributes to a metal production's heaviness, or weight, panning the rhythm guitars very wide in this manner can provide a contribution to the perceived width, and therefore size, of the production.

## **7.4 Perceived Volume Levels, And Perceived Consistency Of Volume Levels**

A further essential factor contributing to the concept of 'heaviness' and sonic power that signifies the aesthetics of metal music is the perception of high volume levels (Weinstein, 1991, p.23; Walser, 1993, pp.43-45). In addition to the performance characteristics and choice of sounds the musicians in question use, this perception of volume is primarily conveyed through the heavy minimisation of the dynamic range of various elements of the instrumentation, as well as through the use of distortion.

The overall dynamic range of many modern popular music productions has become very small from a macro perspective (Katz, 2002). In this instance macro, or macromixing, refers to the finished mix taken as a whole, whereas micromixing refers to the individual instruments and audio sources that the mix comprises (Izhaki, 2007, p.54). CM productions tend, additionally, to have a very low dynamic range from a micromixing perspective. This is particularly so with the bass drum, bass and rhythm guitars, and this low dynamic range is important for providing the perception of loudness, and therefore heaviness, required of the genre.

In the instance of bass drums, the use of sample reinforcement or replacement, most often implemented at a fixed dynamic level, provides an effective solution to restricting dynamic variation. As Gibson states, compression techniques can be used to provide more volume stability and make sounds more present (Gibson, 2005, p.79). However, the uses of aggressive compression techniques will often not only provide effective restriction of dynamic range, but also present the advantage of increased harmonic content being created of the audio source in question. Due to that more overtones are normally produced when an instrument, in this instance a drum, is struck harder than

when it is struck less hard, an increase in overtones will usually be perceived, and associated, with high volume levels. With the bass guitar, aggressive compression to heavily minimise dynamic range is frequently applied in the form of series compression. Furthermore, the introduction of an element of distortion to the bass sound can have the impact of effectively compressing the overall sound.

For rhythm guitars, the impact of distortion:

...simulates the conversion of the guitar from an impulsive to a sustained or driven instrument, and this transformation may be part of the acoustic correlate to the perceptual experience of heaviness. (Berger and Fales, 2005, p.194).

In effect, distortion provides the rhythm guitar with a flatter dynamic envelope (Berger & Fales, 2005, p.194) and with it an almost infinite sustain, providing a great capacity for sonic power and expression (Walser, 1993, pp.42-43). It is normally the case therefore that rhythm guitars for the metal genre will not need their dynamic range limiting, as, by their nature, they are already compressed.

## **7.5 Spatial And Depth Characteristics**

From a spatial perspective, relating to the perceived depth of CM productions, most of the sounds are very up front, present and close to the listener. Here, the principal reason for sounds being placed up front and close to the listener, as Gibson argues, is that with an increase in distance, sounds are perceived as softer and less intense (Gibson, 2005, p.23). Clearly a decrease in intensity, with sounds being perceived as softer, contradicts the core textural aesthetics of the CM genre.

To place sounds very up front and close to the listener, the genre's production tends to make minimal use of the natural ambience and room colouration of the recording space. When world-renowned specialist metal producer Colin Richardson (who includes many of the world's foremost metal acts amongst his extensive credits) was asked about his use of room/ambient microphones, he replied "We don't use them. The further away you go, the less in your face it sounds. I've tried room mics, but I just get into awful trouble with them" (Richardson, 2011). Huber and Runstein note that excluding the acoustic environment creates a tight and present impact (Huber and Runstein, 2005,

p.138) and due to the exaggerated sense of aural intimacy that this provides (Zagorski-Thomas, 2008, p.204), close microphone placement, sometimes referred to as spot miking, tends to be standard for CM production.

Worthy of mention, however, is that quad-tracked guitars, which feature four separate performances, sometimes present a slightly ambient quality due to the natural flamb that occurs between these layers (Richardson, 2011).

Similarly, restricted use of reverb, which Izhaki refers to as the primary tool for positioning sounds within the depth field (Izhaki, 2007, p.405), is characteristic of the mix stage for CM. Here it is often the case that no more than two different reverbs be used for a mix. Perhaps with one small, tight plate reverb for the snare and toms, and one slightly longer reverb used for the vocals and perhaps clean and solo guitars. In both instances it would be unlikely that longer reverb times, for instance over 1.3 seconds, be used, other than in the event of special effects.

In summation, the spatial and depth characteristics of a CM production can be described as relatively 'dry' when compared to other genres of rock music with similar instrumentation.

## **7.6 Transient Design**

In this instance, the term transient design refers to controlling the way a sound begins, continues, then fades, and the variations that it displays over this time. Concepts such as attack and decay, as well as sustain, are frequently applied to describe these variations (Huber and Runstein, 2005, pp.56-57).

Due to the deep and dense sonic characteristics of the bass and rhythm guitar tones, achieving a drum sound that punches through the sonic wall created by these timbres is challenging. The presence of these drum hits provide a fundamental contribution to perceived heaviness. As Moylan points out "important characteristics need to be deliberately shaped or captured to precisely determine the aspect of the recordings aesthetic" (Moylan, 2007, p.264). This is particularly so with the bass drums, which can be considered the most important constituent part of the drums for CM, and are essential

for supplying the production with a sense of solidity, drive and urgency.

A bass drum is naturally assumed to have a more consistent tonality than the rest of the shells, due to a bass drum's beater being at a set, unchanging position. However, the force of the bass drum's attack during performance is variable. Despite this, retaining or creating consistency to the bass drum's transient attack is essential for this style. Therefore, the initial stages of transient design for the genre's bass drums will normally feature the use of drum samples, implemented without any dynamic variation, and Dunkley and Houghton even go as far to say that the use of drum samples is the only way to get the drums to punch through the sonic wall of guitars (Dunkley and Houghton, 2011). Here, an effective bass drum sample will usually have: a hard, clear attack transient; deep and dense, but controlled, low frequencies; sharp and aggressive high frequencies, and will often feature a quite extreme attenuation of the low-mid frequencies. Although it is usual for snare drum sounds for the genre to be relatively dense in order to cut through the rhythm guitars, production for the style will demonstrate large variations in tone. Once again however, retaining and creating consistency of the snare drum's transient attack is advantageous, and sample reinforcement, or even replacement will achieve this. If the right choices with bass drum or snare drum sample selection are made, then the requirement of further processing, normally in the form of compression or equalisation, may be minimal. However, in many cases, and often when there is less reliance on the use of drum samples, transient design of the bass drum, snare and toms will be required. In the instance of the bass drum, snare and toms, it is often the case that short compression attack times will be avoided. This is to allow the transient attack of the drum hits to be emphasised, in order to punch through the bass and guitar tones.

Sculpting the transient of the bass guitar is similarly important. Although it is important that the note definition of the bass, which is impacted heavily by the transient attack, is retained, it should interact in an appropriate manner with the bass drum, and suitably reinforce and 'sit' with the rhythm guitar. Here, the approach to transient design, most often through compression, will be heavily impacted by whether the bassist performed with a plectrum or fingers, the speed and complexity of the performance, as well as the context of the other elements of the production in which the bass will be placed.

The use of distortion on rhythm guitar tones for the CM genre will have normally converted the instrument from being relatively impulsive in nature, to having a relatively small dynamic range (Berger and Fales, 2005, p.194). For this reason, it is usually the case that rhythm guitar tones will not need any transient design.

## **7.6 Vocal Characteristics**

The term 'heavy' is most frequently associated with characteristics relating to drums, bass and guitar, as well as the balance of these elements when combined in the context of the overall mix. However, the subjective perception of heaviness can also be impacted by vocal timbre (Berger and Fales, 2005, p.181). Connections between the genre's heaviness, and the level to which the band or sub-genre avoids melody have been highlighted by some academics (Kahn-Harris, 2007, p.32). This could be said to particularly relate when applied to vocal styles and sounds and their contribution to perceived heaviness. Primarily though, vocals shunning melody would additionally need to be combined with a high level of vocal aggression in order to contribute to a production's sense of heaviness. Aggressive vocal techniques for the genre are often associated with shouting, thereby resulting in vocal distortion, which, to some degree, can be embellished or simulated with processing during the mix stage. However, it is more likely that a high level of aggression applied at the performance stage would contribute to a production's sense of heaviness, rather than processing to emulate this. Furthermore, vocals for the genre are likely to exhibit a very small dynamic range, normally achieved through radical compression settings, often applied in series.

## **7.7 Performance Attributes**

The subjective quality 'heaviness' can also refer to performance attributes.

# **8. Definition And Intelligibility**

As mentioned, CM's production values seek to emphasise the definition and intelligibility of the instrumentation involved. As world renowned and highly prolific metal producer Colin Richardson states, due to the methodical and clinical nature of the metal

genre's performances, this clarity is essential to the style (Richardson, 2011).

Definition and intelligibility are often considered to be similar in meaning, but can be distinguished from each other. The term 'definition' refers to what it is about a single sound that makes it easy to perceive and understand. In other words, what are the characteristics that a sound source contains that will allow it to be distinct and decipherable? Whilst definition contributes to intelligibility, intelligibility refers to the ease of perception and understanding of a particular instrument or sound source within the context of the mix as a whole. As Izhaki states "Intelligibility is the most elementary requirement of sonic quality" (Izhaki, 2008, p.5) and this statement has particular relevance to CM. Here, it is essential that the intelligibility of the often precise, intense performances, for example fast double-kick drum patterns, be retained.

### **8.1 Specific Challenges To Definition And Intelligibility**

Heaviness is largely associated with the metal genre's rhythm guitar tones. However these dense, down tuned, heavily distorted, and often quad-tracked, rhythm tonalities present a fundamental and particular challenge to intelligibility. This is principally due to the considerable range of the frequency spectrum that these guitars occupy with increased higher harmonics, combined with potentially endless sustain due to acute harmonic distortion. Although the heaviness, weight and density of these tones embody the essential aesthetic of metal, it is crucial that the low frequencies of the rhythm guitar sound are tight and controlled to retain note definition. Furthermore, it is important that there is a strong level of energy in the high frequencies, the perception of which is vital for an increased sense of heaviness and presence (Berger and Fales, 2005, pp.193-194). These elements are fundamental to achieving a high commercial standard of CM production. However, once these qualities are appropriately presented, this has considerable implications on the techniques required to provide intelligibility to the productions other instrumentation – particularly the bass drum, bass and vocals. For example, gaining vocal intelligibility can be challenging due to that the essential high frequency content of each tends to reside within a similar range. Additionally, this range will normally have been significantly emphasised on the rhythm guitar.

Similarly, the speed of subdivisions frequently employed in CM, for example, double

bass drum performances, and fast alternate picking, can be an obstacle to capturing and presenting an appropriate level of definition and intelligibility.

## **8.2 Presence**

Boosting certain frequencies will accentuate the presence of a sound more than others, making it seem even more in your face. (Gibson, 2005, p.23)

Here, Gibson's statement regarding the accentuation of the presence of sounds making them more 'in your face', very much relates to the overall aesthetic requirements of CM. The presence range of frequencies is generally considered to be between 4kHz and 6kHz and this area can be seen as having particularly high relevance to the definition and intelligibility of CM production. This is for the reason that the amplification of this range will normally make the bass drum, snare, bass guitar, rhythm and lead guitar, as well as vocals seem 'harder', more distinct and closer. Additionally, Zagorski-Thomas suggests that the amplification of high frequency content suggests intimacy and proximity (Zagorski-Thomas, 2008, p.204). Emphasising these frequencies, therefore, is a principal approach for providing clarity and definition for the instrumentation involved, thereby presenting a clear and coherent production. Furthermore, increasing high, as well as low, frequencies will often result in sounds being perceived as louder than they actually are. This is for the reason that human hearing is more sensitive to low and high frequencies the louder they are in volume (Senior 2011, p.62). Conversely, attenuating the 4kHz to 6kHz presence range of frequencies can result in the relevant sound being perceived as thinner, more distant and softer; and it can be noted that over-amplification of this range of frequencies can cause the audio content in question to sound harsh and abrasive.

However, to restrict the focus of this presence band of frequencies solely to the amplification of this range would be a mistake. As Izhaki points out, equalisation can be looked at from a yin and yang point of view, therefore the greater the level of low frequencies, the less that the higher frequencies will be perceived (Izhaki, 2007, pp.234-236), a perspective that is also highlighted by Maserati (2009). Therefore to increase the apparent level of the 4kHz to 6kHz frequencies of an audio source, a reduction in low-mid frequencies, for example the 300Hz to 500Hz range, could be implemented. Furthermore, there are supplementary benefits to attenuating rather than amplifying



frequencies. This is due to the propensity of equalisation to place frequencies out of phase with each other (Izhaki, 2008) and “The more gain there is the more severe the phase artefacts become” (Izhaki, 2008, p.236).

Additionally, it is inadvisable to simultaneously amplify the same range of frequencies on multiple instruments, as this tends to sound unnatural and unpleasant, causing an unpredictable overall mix level, due to the resulting ‘loud’ section created in the frequency spectrum. Furthermore, in many instances, an audio source’s range of frequencies that may require amplification to provide definition and intelligibility may not be within the 4kHz to 6kHz presence range. An example of which would be the bass guitar, where generally speaking, the attack and note definition can be emphasised by amplifying the 2kHz to 3.5kHz range.

### **8.3 High Pass Filters**

This concept of reducing low frequencies has high relevance to producing the metal genre; particularly with a busy mix featuring fast, complex performances. Here, the aggressive and extensive use of high pass filters is essential for reducing boomy, uncontrolled, or unwanted low, or low mid frequencies, which have a tendency to accumulate and resonate. By reducing these low frequencies, the high frequencies, where the clarity of the instrumentation is associated, can be emphasised, resulting in these sounds being perceived as louder and more intelligible within the mix. Izhaki states that the use of a high pass filter “clears some space for the bass and kick, but more importantly it can add clarity and definition to the treated instrument” (Izhaki, 2008, p.243). For CM production, high pass filters can be used quite aggressively for the down tuned bass and guitar tonalities, and can be set above the fundamental, which can frequently be as low as 30.868Hz and 61.735Hz respectively. This is due to the ability of the brain to reconstruct fundamentals that have been removed or attenuated (Izhaki, 2008, p.244).

### **8.4 Separation Techniques**

“When two or more instruments are fighting for the same frequency range, we can find it hard to discern one instrument from the other” (Izhaki, 2008, p.207). To provide

the necessary definition and intelligibility for a CM production's instrumentation, separation techniques therefore need to be employed. These techniques include focussing on attenuation rather than amplification, the use of high pass and low pass filters, avoidance of simultaneous amplification or attenuation of the same frequency on multiple instruments, the attenuation of frequencies on masking instruments rather than amplification of the same to the sound being equalised, and mirrored equalisation choices whereby the amplification of a certain frequency on one sound is mirrored with the attenuation of the same frequency on another relevant sound.

## **8.5 Compression**

Compressors/limiters can also be used to make sounds more out in front. They do this by stabilising the sound so it doesn't bounce around so much in volume. When a sound is more stable, our minds can focus on it more clearly, making the sound more present. (Gibson, 2005, p.23)

Compression is the primary tool when retaining the stability and consistency of a sound within the context of the mix. When applied appropriately, compression can therefore contribute considerably to the intelligibility of the relevant instrumentation in the context of the overall mix.

## **8.6 Performance Attributes**

The qualities of definition and intelligibility can also refer to performance attributes. Examples of which would be aggressive drum performance techniques, which will accentuate attack characteristics, and the use of down picking, which will normally create an aggressive element to the guitars attack characteristics.

## **9. Conclusions**

- This paper has presented the defining features of the genre's high commercial standard of production as heaviness and sonic weight combined with definition and intelligibility of the instrumentation involved.
- Relating specifically to heaviness and intelligibility, this paper has contextualised

- and characterised CM from a performance and tonality perspective.
- This paper has highlighted the tonal and performance challenges and obstacles to achieving heaviness and intelligibility.
  - It has emphasised that the domains involved with perceived heaviness are frequency content, sound at source, density of sounds, perceived volume levels, and perceived consistency of volume levels, a minimal impact of spatial and depth characteristics in the form of ambience and reverb, transient design, vocal characteristics, as well as performance attributes. The paper has drawn attention to the salient points of each of these areas.
  - This paper has discussed the specific challenges to definition and intelligibility presented by CM tonalities and discussed sound at source, presence, high pass filters, separation techniques, compression and performance techniques as the relevant areas that can be controlled and manipulated to capture and present definition and intelligibility.

### **About The Author**

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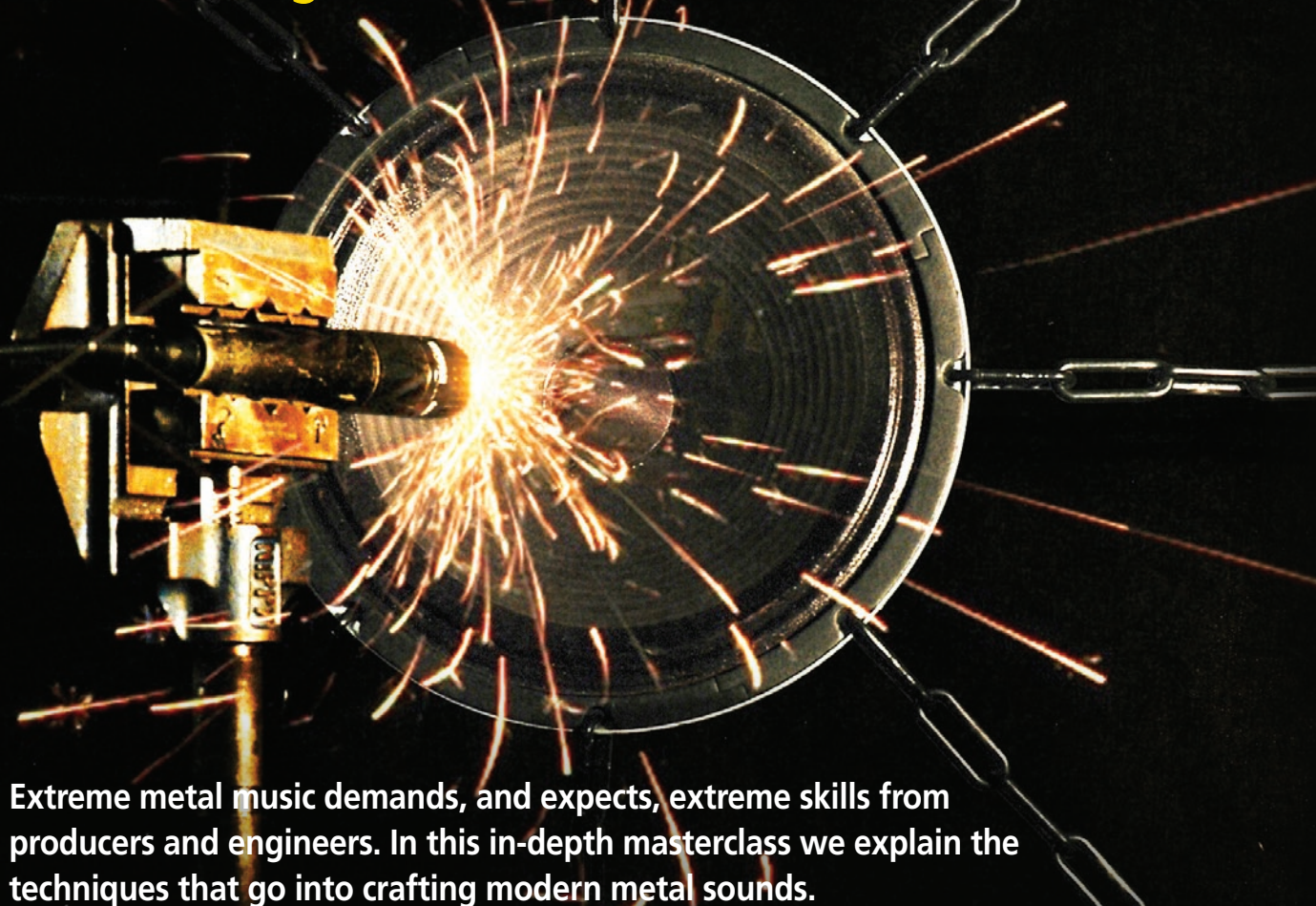
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# Extreme Metal

## The SOS Guide To Recording & Producing Modern Metal



Extreme metal music demands, and expects, extreme skills from producers and engineers. In this in-depth masterclass we explain the techniques that go into crafting modern metal sounds.

Mark Mynett

**M**odern extreme metal is anything but a passing fad. With countless clubs, fan/webzines and mainstream magazines and radio stations nurturing and sustaining the scene, it comes as no surprise that an act as extreme as Slipknot gained the number one position in the US *Billboard* 200 with their last album, *All Hope Is Gone*. Over their career, the band have sold more than 10 million albums worldwide.

However, extreme metal remains one of the most challenging styles to produce. The combination of down-tuned instruments, dense and distorted tones, and intense performances presents the engineer with serious challenges when it comes to achieving the required clarity and definition. In this article and next month's follow-up, I will explain the specific production, engineering and mixing techniques that represent the state of the art in metal recording, with contributions from a number

of top producers, engineers and musicians.

This month will focus on the often misunderstood and undervalued area of pre-production, as well as the engineering and recording part of the process, with the next month's article covering mixing.

### Pre-Production

For obvious reasons, a record producer's natural habitat is assumed to be the recording studio. But it is usual that there is another element to the process of

a successful production, and its importance is too often overlooked. Before the band and producer enter the studio, there is likely to be a period of time spent working out the ideas, direction and fine details of the ensuing production. In essence, pre-production can be viewed as designing the project's blueprint, and along with many other producers, I believe that this is the cornerstone of a successful album or project.

A successful producer needs the ability to look beyond the technical aspects of microphone type, placement and processing. A producer's personal talents and his ability to motivate, inspire and organise cannot be underestimated. As well as being technician, musician and engineer, a record producer may have to be part psychologist, career advisor, songwriter, close friend, lyricist, drill sergeant and therapist. Essential elements to nearly all of these roles are respect, understanding and trust. In turn, this facilitates a fundamental goal of pre-production: settling on a collective vision of what the band are about stylistically and musically, how the album is going to sound and how this is going to be achieved. Having this vision for the final product allows the producer to control and guide the project in such a way as to realise something that will please everyone. Clearly, the vision can be fine-tuned along the way, but clarity during pre-production should ensure that the elusive but essential 'vibe' of the project is right.

In pop and rock music, pre-production time is often used mainly for song development, working out structures and arrangement changes that will mould the songs into an acceptable format and length for commercial radio airplay. Due to the nature of extreme metal, however, it is unusual that any significant time is needed in these areas. Instead, record producers from the genre will concentrate on the numerous challenges and issues that arise from the intense, down-tuned,

**Andy Sneap: "The problem that many producers have with the extreme metal genre is that they don't have a vision of how a project should sound at the end. So many people just try and copy certain drum or guitar tones, without thinking about the big picture and how everything works together."**

rhythmically intricate and often heavily syncopated nature of the music.

### The Rehearsal Studio

The initial meeting will more than likely take place in the band's rehearsal room. Here, I would want to hear the whole band

apparent to the band on playback. It is not a given that just because the songs work well in a gig scenario, the same will apply in the studio. (It is obviously preferable to be in the same room as the band for pre-production, but when this is not possible, a certain amount of work



Slipknot have sold over 10 million albums without toning down their extreme metal sound.

play through the songs for the project in a relaxed scenario without the expense and pressure of being in a recording studio. As well as assessing whether the band can perform the songs competently and comfortably and that the arrangements work, the relative strengths and weaknesses of the individual performances and musicianship will be evaluated, and comments fed back accordingly. Remember that a producer's job is not only to maximise a band's strengths but also minimise their weaknesses, and pre-production is the right time to pull back in a musician who is trying to play parts that are outside his or her comfort zone. At this stage, I will be particularly focused on the drummer, whose performance will provide the foundation of the entire production.

Musicians often won't notice possible issues whilst they are playing, especially if they have never recorded the material before, so it's a good idea to make rough recordings of these rehearsal sessions, as any potential concerns will often become

can nevertheless be done with rehearsal recordings over email.)

This is also the right time for the producer to speak with the band members about properly fine-tuning their parts, by experimenting with any ideas that either of them may have: different drum fills, guitar overdubs, vocal harmonies and so on. Obviously, if new ideas come up in the studio, that's fine, but rehearsal time is usually a fraction of the price of studio time, so working things out at this stage enables the studio time to be used much more effectively.

### The Project's Budget

It is hardly news that many independent labels are struggling to stay in business, and album budgets have been in decline for many years. This financial pressure directly affects the record producer, whose responsibility it is to manage the budget. Whether producing a project for Roadrunner Records or simply a three-track demo to put up on MySpace, pre-production is the time ►

### Politics & Production

**Pre-production provides the perfect opportunity for the producer to work out the band politics. Is there a single 'alpha' member or partnership that is the creative and driving force, or is it a democracy? Working out the various personalities, abilities and levels of dedication within the band will help you to keep each member happy as the project progresses.**



## RECORDING & PRODUCING EXTREME METAL

The rehearsal studio is where some of the metal producer's most important work is done.



- ▶ to save money. It pre-empts any problems that may appear when the studio clock is ticking, saving time, and therefore money, in the process.

### Right Clicks

One of the issues that is usually right at the top of my pre-production priority list is the subject of click tracks, for the drums to be tracked to and for the project generally. In my experience of extreme metal, the use of click tracks is one of the overriding factors that separates a convincing album production from a demo. As producer Russ Russell says, "The threshold of accuracy and tightness that people expect from extreme

metal is extremely high."

Although there are many styles of music where the use of a metronome is not desirable, and where tempos are allowed to breathe slightly, this is predominantly not the case for modern metal. The kick drum work, beats, patterns, subdivisions and syncopation involved in extreme and modern metal demand the very highest standard of precision and accuracy to facilitate the tightest possible production. As Meshuggah's drummer Tomas Haake explained in May 2008's *Modern Drummer*, "I do feel we need a click... a lot of the stuff is really hard to play on guitar, which means that if I strayed over the course of a song

and by the end I played 10bpm more than at the beginning, it would be impossible to play on guitar. So I have to use a click track to maintain a steady pace."

Even extreme metal bands with less common time signatures and challenging tempo changes, such as The Dillinger Escape Plan, take advantage of the benefits here, often spending considerable time fine-tuning the tempo-mapping to perfection. The use of a click track provides an essential central reference point in forcing a drummer to tighten up his beats and parts and allows the producer to accurately assess his or her performances.

Additionally, due to the fast kick-drum patterns involved (double kick-drums or pedals are a prerequisite) and the intricate nature of the drum parts, it is normal that the drum tracks heard on a finished production are not entirely as performed. Often, a variety of invaluable kick-pattern building and drum editing/quantisation methods will have been employed to produce incredibly tight, almost superhuman-sounding drum performances. Creating these is one of the particular production challenges of the genre, and ultimately, the use of clicks when recording the drums facilitates this process. There are also wider production benefits: instrumental parts can be copied and pasted within the arrangement, which is not possible if the tempo varies even marginally, and loops and programmed elements can easily be added. The subject of click tracks is thus usually discussed from the very first contact

## Comfortable Clicks For Nervous Drummers

It is the producer's responsibility to take whatever steps he or she feels are necessary to get the right performance and recording. So, if the producer feels that a click track is essential to a project, it is sometimes the case that he or she will have to talk a reluctant drummer round to the idea of tracking to a click. Once drummers get used to them, click tracks are not really that big a deal, but drummers with no experience of a click are often surprised at how difficult it is to play consistently with one. Obviously, the recording session itself is not the time or place for a drummer to be getting comfortable playing to a click, so this needs to be sorted out at the pre-production stage.

My own observation is that it is simply through lack of experience that the term 'click track' strikes fear into some drummers, who struggle with the concept of having to follow one. However, in the initial stages the exact opposite should be the case: in other words, the click should be made to follow the drummer. There is always a perfect

groove for every part of every song, and obviously, the key to finding the correct tempo for a click track is to work this out. If a drummer can be in a rehearsal room playing a song with a bassist and guitarist at a perfect steady groove and tempo, there should be no reason why he can't do the same with a click track and guide guitar.

One method of working tempos out is to get a recording from a rehearsal where there was a great performance of the song, at least in terms of tempo. It is a reasonably simple process to calculate the tempos of all the song sections and to program a DAW or drum machine accordingly. Another method is to use a product such as Tama's Rhythm Watch or Yamaha's Clickstation to provide a click track and work out the correct tempos during rehearsal, simply moving the bpm setting up or down until the perfect pace is found for each part.

A cowbell, woodblock, or similarly piercing sound with plenty of 'body' is a perfect click sound, as it is easily distinguishable from the

sounds of the drum kit itself. Some drummers prefer to have the first beat of the bar differentiated, for instance with a higher cowbell or woodblock. In a situation where a drummer is having problems locking with the groove of the song, it's worth experimenting with a sound for the off-beats. For example, in a standard four-beats-to-the-bar rhythm, place clicks with a different sound from the down-beats on the eighth notes in between. Also consider moving from quarter notes to eighth notes for slower tempos, as the more space there is between each pulse, the harder it is to keep tight.

In a situation where a band has neither the experience nor equipment required to take care of the tempo mapping on their own, I will go into the rehearsal room with the band and go through this with them. I would then aim at having the drummer practise with the click to get his beats and parts as tight as he can. This is a vital element of pre-production for the drummer and its importance cannot be overstated.

## About The Author

Mark Mynett is a record producer specialising in the metal genre, and is a Senior Lecturer in Music Technology and Production at Huddersfield University. As former guitarist with English metal band Kill II This, he has toured with the likes of Slipknot, Megadeth, Machine Head, Anthrax and Fear Factory. He is currently completing a PhD on extreme and modern metal production.

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I have with the band directly.

Ideally, a producer should aim to have the drummer practising along to exactly what he will hear when tracking the drums in the studio (see box, left). A minority of drummers are able to practise and record to a click without any guide tracks whatsoever, but most are more comfortable having a guide guitar and/or bass and vocal present. Sometimes, if a band is well experienced with pre-production, I will leave them to record the guide tracks themselves; otherwise, I will get together with the whole band to record these parts to the click. This is both the perfect time to ensure that they are in complete agreement about the song arrangements and parts, and a great opportunity for the producer to get familiar with the songs and spend further general pre-production time with the band.

From here, the band should have the perfect template for the drummer to practise to, either with the rest of the band or without. The click alone can be solo'd in rehearsal with the whole band (either with everyone hearing the click, or just the drummer), while the guide tracks can be used as well if the drummer is rehearsing alone. Once the mapping and guides have been completed, the drummer should find that playing to the click track is relatively easy, and many find that once they have settled in, the presence of the click is reassuring. Generally speaking, if a drummer has the song arrangements properly down, he or she can now concentrate on getting their performance tight and hitting consistently, and can forget about rushing ahead or dragging behind the perceived correct tempo.

### Equipment

The production ethos of extreme metal has an overbearing emphasis on the clarity and definition of the drums, bass and guitar sounds. Well before tracking commences, it should be the producer's responsibility to make sure that the right equipment, providing the right tones, will be used for the recording of the project. This is critical to a high-quality

extreme metal production and the band should be made aware of this.

It is not the remit of this article to provide detailed and subjective evaluations of the relative merits of different pieces of gear, but we can list some general principles and concepts relating to equipment used in metal music, all of which are important considerations for pre-production.

### Skinning A Kit

I've lost count of the number of times a drummer has told me something along the lines of "But those heads were new three weeks ago and I've only done eight gigs with them on!" If the batter heads have this level of use, they will usually be pitted, won't let the drums respond properly, and will inevitably hinder your ability to get the right clarity and tone during the mix. The cost of new drum heads will be incidental compared to wasted time in the studio and a sub-standard kit sound. Therefore, for a project of any significance whatsoever, new drum heads are a must. It's a good idea to get the drummer to change his heads, stretch them in and use them for just one rehearsal to properly bed them in.

If the budget is available, change not only the batter heads, but also the resonator heads. Many drummers make the mistake of thinking that because the resonator heads never get dented, that they last forever. In reality, they lose their resilience and bounce due to the polyester film drying out, and this will have an impact on drum tone. If the band or the album is on a really tight budget, the area to save money on when re-heading is the bass drum; in extreme metal, this is the part of the kit where the least dynamics are required, and therefore the easiest and most effective place to employ samples.

### Drum Tuning

Following the priority of re-heading and bedding in, it is fortunate that drum heads, and their tuning, are at the core of the sound ►

## RECORDING & PRODUCING EXTREME METAL



Drum tuning is a skill that can defeat novices, and devices such as the Drum Dial can provide valuable help.

► we endeavour to capture, because they are the one over which we have most control. Drum tuning is an art in itself and its importance cannot be overlooked, as even the best-quality drum kit on the market is still going to sound poor unless properly tuned. Usually I'll take the opportunity to get a kit tuned before getting into the studio, as this can be a lengthy process.

My own experience has led me to keeping the tuning of both kick-drum heads really low — often so low that the wrinkles of the drum head are only just about taken out, and certainly within a couple of turns of the lugs from the loose position. Obviously, the way the kick drum 'feels' to the drummer needs consideration, but I have never had any success with trying to tune a bass drum's batter or resonator head

tighter to gain click or attack. When using a kit with double kick drums, tune one slightly differently from the other to provide better differentiation.

To maximise the click and attack from the bass drum(s), plastic or wooden beaters are far better than felt ones. Adhesive 'click' pads should also be used on the area of the kick where the beater hits the batter head. Danmar pads are probably the most well known and widely used, and will often come included with a new bass-drum head. Avoid supergluing things like coins or credit cards to the kick-drum batter head as a substitute: these are far less effective at providing click and attack than purpose-made products.

A lot of metal drummers will make the mistake of trying to get their toms to resonate and sustain as much as possible with maximum volume. Although this is relatively easily achieved by tuning the batter and resonator heads to very similar tension levels, a highly resonant kit can cause huge problems for producers, particularly in this style of music, where keeping tones tight and well defined is essential. By tuning a tom's batter head tighter than the resonator head, a tonally pleasing pitch-bend with a deeper, rounder sound is achieved; alternatively, by tuning a tom's resonator head tighter than the batter head, an equally pleasing pitch-bend is achieved, but with a tighter sound and with better attack. Generally, I can recommend keeping the toms tuned quite low overall, to give a more powerful tone with increased low end.

While on the subject of tuning, for anyone who needs help in this area, I will take the opportunity to recommend the Drum Dial ([www.drumdial.com](http://www.drumdial.com)) which I find excellent for quickly and accurately tuning toms. This gives a reading of the tension of the skin approximately an inch from each drum lug. You get a rough guide chart with the Drum Dial as to what tensions your batter and resonator head should be tuned to for different tom sizes, and from here you can use your ears to fine-tune the toms to perfection.

If at all possible, I will attempt to tune out any unwanted rings in the snare or toms, as an undamped drum will have the best resonance and tone. However, in many cases this just isn't possible. Avoid using gaffer tape to damp drums, as it is prone to vibrating and buzzing, which can easily be picked up by spot mics in the studio. I've always found 'Moon Gel', made by the RTOM Company, to be the best product on the market for damping. The pads can be repositioned until exactly the right degree of damping is provided, and can be cut into smaller segments if need be. Use WD40 or similar lubricant to eliminate any squeaks from the kit (particularly from the kick pedals) and consider packing the lugs with purpose-made plastic retainers if you are having problems with lugs not holding their tension.

To maximise cymbal separation from the rest of the kit when tracking the drums, it is beneficial to get the drummer to lift his cymbals up as high as is possible without cymbal hits becoming uncomfortable. The

## Video Interviews

To accompany this feature, I've tracked down two of the leading producers and engineers working in the extreme metal field and pumped them for details of their working methods and technical secrets. The quotes in this article are taken from video interviews with Russ Russell (Napalm Death, Dimmu Borgir, Evile) and Andy Sneap (Megadeth, Testament, Exodus, Arch Enemy, Killswitch Engage, Machine Head), which you can watch at [www.soundonsound.com/sos/nov09/articles/metalvideos.htm](http://www.soundonsound.com/sos/nov09/articles/metalvideos.htm).

You can watch video interviews with leading metal producers Andy Sneap (left) and Russ Russell on the SOS web site.







further the cymbals are placed away from the shells, the easier it will be to make the rest of the kit sound good. Clearly, the sooner the drummer can start practising like this during pre-production, the better. Make sure that the cymbals are properly cleaned before recording begins.

## Bass & Guitar

Apart from the actual playing, the most important aspect of any bass or guitar recording for modern metal is choosing the right equipment for the task. Good bass and guitar sounds in an extreme metal production depend on at least six factors:

- The quality of the wood, hardware and construction of the instrument itself, as well as the action of its strings and the way it is intonated and set up. Be aware that some modern guitars, such as the lower-end Ibanez models, have a rhythm sound that leaves a lot to be desired, usually due to the inferior wood used for the body, leading to a bottom end that is nowhere near tight enough. Invariably, guitars in the genre are tuned down by a minimum of two tones, and obviously this affects the action and intonation. It's surprising how many musicians do not have their instruments specifically set up to compensate for this or the thicker string gauges used, and failure to do so will often result in tuning issues, fret buzz and an inferior overall tone. Needless to say, this should ideally be taken care of prior to getting into the studio.
- The age, quality and gauge of the strings are important, as is the degree to which they are down-tuned. It is amazing how quickly strings can go dead with constant heavy use in the studio, and once the clarity of the high-end note definition and

presence from the strings has gone, this is not something that can be 'fixed in the mix' with EQ. I usually have bassists and guitarists replace a set (or, if appropriate, a half-set consisting of the thickest two strings for bass or three for guitar) every three to four hours of constant use.

- Using strings that are too light usually leaves the guitar with a thin, poor rhythm tone, and affects its ability to retain its tuning, due to the insufficient string tension and the resulting 'bow' in pitch. As a general reference, when a guitar is tuned down to 'C', 52 (guitar) or 120 (bass) is the thinnest gauge that should be used for the lowest string, with all the other strings stepped up in gauge accordingly, depending on whether a 'dropped' or 'straight' tuning is used. The lower a string is tuned, the thicker the strings should be.
- The choice of pickups has a considerable impact. Many metal producers prefer EMG 81 pickups for guitar, although I have always had admirable results when guitarists have used a Les Paul with the original passive pickups. For bass, I personally favour active pickups.
- If the amp used in tracking is not the right choice, with poor note definition/tone or a loose low end, even the most skilful EQ will not completely solve the problem. Obviously, it is preferable to get these sounds recorded correctly in the first place and avoid having to re-amp. The Ampeg Classic is my bass amp of choice, having a particularly warm but aggressive tone when driven. For guitar, I was a Marshall user for many years, but I have found that they are not always well suited to down-tuning, unless modified. More modern

Choice of loudspeakers makes a big difference to guitar sound. Shown here are two popular choices from Celestion: G12M 'greenbacks' and Vintage 30s.

tube amps — for example, the Peavey 5150, the Mesa Rectifier and the Krank Krakenstein — often have a much better voicing for the genre. If you are putting new tubes in your head before recording, make sure the amp has been properly biased.

▪ The speaker cabinet is an often overlooked but vital part of the equation, and the size, type and density of wood has a considerable impact on the resulting sound. I once recorded an Ampeg Classic bass head through a cab which, although loaded with high-spec speakers, was a cheap box made of chipboard. The old adage of 'Your sound will only be as good as your equipment's weakest link' was never more relevant, as the mic on this bass cab was left with numerous nasty resonant frequencies, requiring a lot of corrective EQ in the mix. For bass I usually opt for either an Ampeg or Mesa cab. For guitar, modern cab designs such as the Mesa Rectifier have a higher wood density than the standard Marshall 4 x 12, usually resulting in a better tone, with a tighter bottom end.

▪ Speakers matter too. Many guitarists and producers have a preference for Celestion 'greenback' 25s, as used for Machine Head's classic debut album *Burn My Eyes*. I also favour Celestion Vintage 30s, which have a really tight low end, are harmonically rich and are ideal for modern tube amps.

## Vocal Pre-production

The highly aggressive and powerful nature of extreme metal vocals requires great stamina and strength and, invariably, there ►

► is a finite number of hours each day that the vocalist can spend fully committing to these parts. Clearly, if you leave, say, two or three days at the end of tracking to get all the vocals done, this puts pressure on the vocalist to continue tracking even if their performance isn't happening. As far as vocals are concerned, therefore, the first pre-production consideration should be to schedule the recording sessions over as many days as possible.

Quite often, as soon as the drums have been completed I will intersperse tracking the bass and guitars with recording the vocals. In order to do this, you may need to start tracking vocals to a guide guitar. If doing so, be completely sure that this guitar was correctly intonated, to avoid potential vocal tuning issues with the final rhythm guitar tracks. Make sure the lyrics are completed and that multiple copies are printed out prior to the first session. I can also recommend separating out recording sessions for different vocal styles onto different days, concentrating on getting any cleaner, melodic parts recorded first; aggressive hardcore styles can often have a negative impact on vocal range.

## Engineering & Recording

The engineering and recording side of music production is an art in itself. It requires technical knowledge and understanding of the equipment, but, just as importantly — if not more so when considering the very specific sound of the genre — finely tuned critical listening skills and musical understanding.

Before starting a discussion about engineering and recording for the genre, it is worth highlighting the fact that due to the consistent dynamics, power and attack

required, drum samples are very frequently employed to augment or replace the basic recordings. I'll explain the consequences of this for the initial drum recordings presently, but even when you do plan to use samples, the starting point of any serious drum recording session should always be the same: you should be hearing the sound you want from the kit before miking up begins.

The kick drum is likely to be the part of the kit which, in the final mix, will bear least resemblance to this drum's natural acoustic properties. When recording, it is essential to capture the two frequency elements that will usually be the focus of the heavy EQ settings used on the kick in the mix: the weight and the attack. (Personally, I never use EQ for any instrument when tracking, as I feel it is a mistake to colour the audio without the option of removing these settings later.) My method of choice is to double-mic the kick(s), with one mic placed to capture the weight and the other for the attack.

The weight would be captured with a large-diaphragm dynamic mic such as AKG D112, Shure Beta 52 or Electro-Voice RE20, half in and half out of the resonator head's sound-hole or, alternatively, a few inches in front of the resonator head, away from the sound-hole (avoid the centre of the resonator head, which will often sound overly boomy). The attack will be captured by close-miking the batter-head beater contact area from three or four inches away, inside the kick drum. In this position, access for the boom arm of the mic stand can often be a problem, as the sound-hole will often be restricted by the other mic. To address this issue, I usually use a Sennheiser MD421, which is lighter and less bulky

than D112s and so on, and hence more easily manoeuvred into position; a 421's

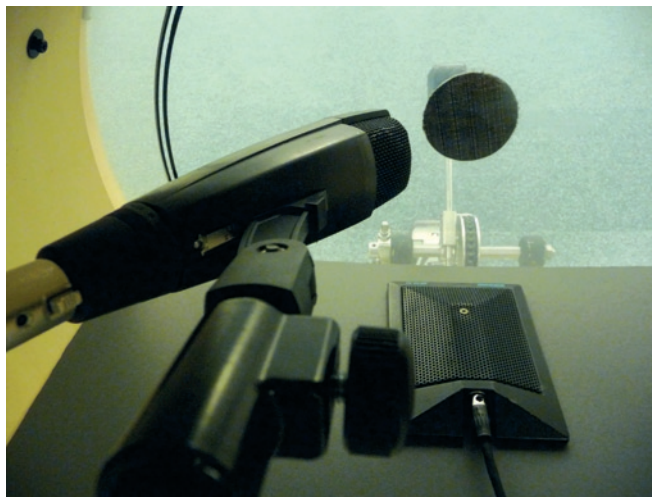
frequency response is also well suited to capturing a kick's attack. Once again, avoid having the mic dead central within the drum: instead, point it at the beater area from off-centre (so that it is also off-axis to the batter head itself).

Alternatively, I have also had a lot of success capturing a kick's attack with a Shure Beta 91, which is a low-profile or 'cartridge' design that doesn't need a mic stand. Either secure the mic on top of the kick's dampening blanket further towards the batter head, or if you have time to remove the resonator head, secure some strong corrugated card horizontally across the kick drum, so the middle is around a third of the drum's height, and gaffer the Beta 91 in place in the centre, three or four inches away from the batter head.

Finally, consideration needs to be given as to whether, and to what extent, any editing or kick 'building' will have to be carried out to produce the incredibly fast and accurate bass-drum performances that are such a strong feature of the genre. If it becomes clear from the initial drum performances that a lot of work will need to be done in this area, it is worth doing as much as possible to minimise kick-drum bleed on the other mics when tracking your drums. This is because flams and phase problems will be introduced if either your kick samples and/or kick mics vary in alignment from the kick spill on the overheads and other mics, as will be the case if a lot of kick-building with samples, or quantisation to the kick track(s), has to be carried out. Bleed can be minimised by securing a large, thick duvet over the resonator side and body of the kick; alternatively, you can ask the drummer not to play any footwork in problematic parts of a song. If it becomes clear that the majority of the drum performance will need kick-building work done, it will often be pointless to record the kick drums at all. In this instance I will minimise the kick drums' volume by fully packing them with blankets: this prevents them resonating and bleeding onto the overheads, while still allowing the drummer to play his kick parts.

## Snare, Hats, Toms & Cymbals

There is nothing specific to extreme metal when it comes to microphone selection and placement for the snare, and the standard techniques have been covered many times in *Sound On Sound*. The only suggestion I would make here is to always record a snare bottom mic. To me, the



Using two mics for (each) kick drum enables you to capture both the attack of the beater on the head — the job of the Sennheiser MD421 in this photo — and the low-end 'thump' of the drum. In this instance, the second mic is a Shure Beta 91, mounted on a sheet of cardboard suspended across the interior of the drum.

spit and rattle of a snare bottom is a vital ingredient of a great snare sound, and on numerous occasions I have been amazed at receiving albums to mix where this has been left out.

Likewise, there are no specific 'metal' mic choices for hi-hats, ride cymbals and toms; any of the usual close-miking options are possible. As a general rule, I don't use tom samples and will therefore make sure that the spot mics will provide everything needed. If you want more body to your toms, it is worth miking the tom resonators in addition to the batter heads, and using a large-diaphragm dynamic mic such as a D112 or RE20 on the floor tom, rather than the ubiquitous 421.

Moving onto the overheads, my mic technique here will always be dictated by the number of cymbals being used, which, within the extreme metal genre, can be quite high. Much of the energy and driving edge of the production style is provided by the cymbals, and it is imperative that the dynamics between them are as evenly balanced as possible.



► This photo shows a fairly typical setup for recording a metal drummer. In other styles of music one might use a pair of overheads as the main foundation of the drum sound, but here, the mics above the kit are serving primarily as spot mics for individual cymbals. Note also the D-Drum triggers, used to provide spill-free signals for triggering samples at the mix.



**RECORDING & PRODUCING EXTREME METAL**

Where there are too many cymbals or too few mics, you can often get away with using one mic per pair of cymbals.

► In cases where a kit has a relatively small number of cymbals, I will usually individually mic every cymbal from around 18 to 30 inches away, with the mic aimed at the edge furthest away from the snare. When there are a lot of cymbals, I will opt for an overhead mic per pair of cymbals, again placed between 18 and 30 inches away, with a view to getting the volume between each as closely matched as possible. For anyone who has used the method of minimising snare bleed onto a hi-hat mic by which the mic is placed so that the hat is blocking sound waves coming directly from the snare, a similar approach should be used when individually, or in pairs, miking cymbals that are close to the hi-hats. In other words, place the microphone so that the cymbal itself is blocking sound waves coming directly into the mic from the hats. This will minimise bleed-over from the hi-hats on this microphone. Watch out for 'china' crash cymbals, which are invariably really loud and will usually overpower the other cymbals. It is worth designating a separate microphone for the china, and keeping the others as far away as possible.

If separate cymbal miking is not possible, due to microphone or mic-pre limitations, opt for a carefully placed spaced pair, between two and three feet above the cymbals. Keep both microphones the same distance from the snare in order to retain its phase coherence in the overheads (use string to measure



the distance if need be) and to prevent the stereo image from pulling to one side. Also, observe the 3:1 rule, meaning that you should separate the microphones by at least three times the mic-to-source distance (the source in this case being the cymbals), to reduce the audibility of any phase issues.

Many producers and engineers consider ambient room mics to be inappropriate for metal drums, as they are not obviously in keeping with the tight, well-defined sound they are seeking. However, in recent years I have used ambient mics to great effect for my mixes, by processing and gating them in a certain way after time-aligning them with the spot mics. A great deal can be added to the snare, kick, and overall sound, and these processing techniques will be covered in next month's mixing article. Therefore, if

you are able to, I can definitely recommend tracking a spaced pair of good-quality condensers such as Neumann U87s or AKG C414s, about 10 to 15 feet away from the kit. Spend time listening to different areas of the room; it can be worth placing them at knee height to capture low-end punch.

### Triggers, Samples & Edits

If there's a possibility you may be using samples, and you are able to do so, it's well worth recording the audio ►



When miking cymbals, it's a good idea to minimise hi-hat bleed by positioning the mic so that the cymbal shields it from the hi-hat.

## Creating Your Own Drum Samples

Kick and snare samples created from the same kit used for tracking are an excellent source for drum reinforcements during the mix, even if they are used in combination with other samples. As you'd expect, they will sit with recorded drum performances, particularly the overheads, in a really natural way. During the drum tracking sessions, then, find the time to record a number of really hard individual hits of your kick and snare, as well as a couple of rimshots, which can provide interesting results. Producer Andy Sneap told me: "I always get multisamples of the kit after I've put new skins on."

I can recommend recording the overheads and also some ambient mics for these hits, as this will give you room to create different samples to experiment with when starting to mix. Here's producer Russ Russell's approach: "To create a snare sample, I'll mix top and bottom mics and the overheads into a good sound, and then export the right hit." Some producers, such as the legendary Andy Wallace, favour ambient mics to prepare drum samples, whereas others, such as John Cuniberti, take the opposite approach, even to the extent of recording snare hits outdoors in order to minimise ambience.

► output of D-Drum or other brand triggers on the kick(s), snare, and even possibly the toms. Triggers suffer much less spill than close mics, so their audio output provides a really clean signal for triggering drum samples; as we'll see next month, they also offer a highly accurate source to feed to the side-chain inputs of kick and snare gates, which can save a lot of time when it comes to mixing.

At this point, it is worth clarifying the difference between drum replacements and drum reinforcements. In drum replacement, the spot microphone(s) for a particular drum

rolls sounding programmed, with a lack of convincing dynamics or feel — an effect often referred to as 'machine-gunning'. Additionally, the manner in which the overhead mics interact and reinforce the spot-mic drum tones, particularly the snare, is usually an essential element of a great-sounding kit. Clearly, this interaction is lost when completely replacing the spot mic with a sample.

Finally, without wishing to state the obvious, don't leave any drum edits or kick-pattern building until the mix, as you need to get the foundation right before

**Russ Russell: "Bass tones often seem to be the last consideration with a band, as most bass players don't seem to have their own sound or a pre-conceived idea of the sound that they're after. I quite enjoy this, because I get to take care of getting the bass tone right."**

are not used at all in the mix. This would usually be in an instance where the tone of the spot mic is not at all in keeping with the desired sound, and you want to replace it completely with a sample.

However, my own preference, and that of many producers in the genre, is to use the spot mics as the predominant sources for individual drums, but to reinforce or augment them by adding samples on top. It may be that the drum sample provides weight or attack, or perhaps simply a thicker kick tone, and this element is fed into the spot mics to sit behind it at an appropriate level.

The advantage here is that the live feel of the acoustic hits is retained. This is particularly crucial with the snare, where complete replacement can often lead to

overdubs are recorded. If you wish to retain a slightly more human feel, duplicate well-played sections where possible, rather than editing weaker ones, and avoid editing strictly to the grid.

### Bass Guitar

Most metal producers would agree that combining the miked sound of a bass cab with the DI will provide you with the right frequency coverage, and a bass that won't disappear when your recordings are played back at lower speaker volumes.

The DI sound will provide a lot of note definition in the form of 'wiry' mids, and will additionally allow for re-amping if required. A good DI'd signal should be a prerequisite of any metal bass recording.

The amplified signal, meanwhile, will

provide the body and weight for the bass tone. I recommend investing time in finding out which of the speakers in your bass cab sounds best before starting to mic up. Simply get your head right up to each of the cab's separate speakers at an acceptable volume and trust your ears! Or, if you can, A/B the way your mic sounds on each speaker. In a 4 x 10 cab, for example, the two speakers further away from the floor will usually sound noticeably different from each other, and very different from the bottom two speakers. Avoid miking only a 15-inch speaker, which will lack solidity in the bottom end compared to a 10- or 12-inch driver. Some producers like to mic a 10-inch speaker close to the horn to maximise the brightness and attack of the bass. With the bass being down-tuned, there is the possibility that the low end captured by the mic will be 'flabby' and lack the required solidity and definition.

If you are happy with how your bass tone has been set up on the amp and that the tone coming from the cab is the sound you want, first make sure that proximity effect isn't contributing to the problem. Start backing your microphone away from the speaker an inch at a time (although distances further than nine inches or so are likely to prove too ambient), and monitor the effect these changes are having in the control room. If the tone is still not tight enough and there is still too much low end, consider using a dynamic mic with a smaller diaphragm or a low-end roll-off, such as the Sennheiser 421, or even a Shure Beta 57.

Over the past few years, my techniques for achieving the right bass tone have altered hugely. In the early days when I simply combined a bass DI and a bass mic, the results often fell short of the huge-sounding, punchy bass sounds I was hearing on albums. Recording a channel of bass amp/cab modelling simulation is an excellent way of getting an alternative tone to complement and strengthen the sound, and will often help to provide definition and clarity of tone that the DI and mic combination may be missing. I have had excellent results over the years with the Sansamp PSA1 rackmount unit, as well as the Sansamp Bass Driver, although I've no doubt that similar products from other companies will do the job just as well.

### Bass Distortion

For extreme metal, the bass and guitars are invariably down-tuned, and one of the challenges presented by this genre is to get

the bass and guitar to properly 'sit together', frequency-wise, particularly when the bass will often be doubling the guitar riff's root note an octave below. Where the bass is concerned, the key is to capture an aggressive sound with an element of drive or distortion, while still retaining note clarity and definition. When only using a DI and mic on my earlier productions, I would be left with limited options when I wanted to distort or drive the bass sound or an element of the bass sound.

With a cleaner bass sound you will find that you can't get as much level for the bass guitar in the mix without it sounding inappropriate, as it will have a tendency to stand out and overpower the guitars, regardless of aggressive compression. As my productions have progressed, I have found that using distortion is an essential technique to get the bass to 'sit' properly with the guitars and in the mix



It's well worth recording a separate channel of distorted bass guitar, which can be blended with the original amp sound and a DI'd clean signal at the mix. The Sansamp PSA1 amp simulator and a smallish guitar amp such as the Peavey Bandit 112 are both good options for bass distortion.



generally. This in turn allows for the bass to be given more level in the mix, thereby providing a thicker, heavier overall tone to the production.

The best way of adding an element of drive to the bass guitar is recording a separate channel of heavily distorted bass when tracking. You can re-amp a bass DI for this purpose, but I usually record this element at the same time as tracking my DI, amp and emulator, so I will use an active





For metal guitars, good results can be had from a single Shure SM57, but the addition of a second mic such as a Sennheiser MD421 provides more tonal options. In both cases, placement and distance from the cone are critical.

amp and amp simulator. If you follow this method in full, you will have four different

- splitter to provide a signal for this distorted track. During the mix you can then feed this in and combine it with the other sources.

The method just explained means that you have complete control over the heavily driven aspect of the bass. Many engineers and producers have got this wrong, by distorting the main miked-up amp sound, and have ended up with a bass tone that is too distorted or not driven enough.

On the earlier albums I produced, like the French extreme metal act Kaizen's second album *Sink Or Swim*, I obtained good results from using a guitar amp/cab simulator, such as the Sansamp PSA1 again, or the Sansamp GT2, for this channel of heavily distorted bass. Alternatively, I have used guitar pedals such as the Boss Metal Zone, as on the debut Head On album, *XXL*, on a split feed from the DI signal.

More recently, however, for instance on the latest Godsized EP, I have had great success using a guitar amp for the overdriven element of the bass sound, usually favouring a hybrid valve combo such as the Peavey Bandit 112. The amp is miked up as for a rhythm guitar track, with the amplifier's EQ settings focused on providing a lot of mid-range, with relatively minimal high or low end. If you are to be recording this driven amp tone at the same time as your clean bass mic, make sure that there isn't any bleed-over between the two — keep the amps in separate rooms while recording, if possible.

You can be relatively heavy-handed with distortion on this overdriven signal, ignoring note definition and low-end tightness, as this channel will not be used for the main body of the sound. Low end and clarity will be provided by the DI,

bass sounds to balance, process and manipulate during the mix.

### Recording Metal Guitar

When it comes to guitar tracks, all producers will agree that the right sound and tone must be coming from the source before you start. Many guitarists have the attitude of just wanting to plug in and play, often through a rig that leaves a lot to be desired, tonally, and then expecting the producer to deliver an amazing sound; unfortunately, it just doesn't work like that.

Surprisingly, given the importance of guitar tones for extreme metal, once you have got the correct equipment and dialled in the right tone, actually recording the rhythm guitar tracks is usually one of the most straightforward elements of the production. There is no complex engineering technique or hidden secret to getting a great guitar sound, and some of the best metal guitar tones ever recorded were a simple combination of a great player, with the right equipment, miked up with a single SM57. The best advice I can give here is, therefore, to keep your approach to mic selection and placement simple. (Rob Flynn from Machine Head explained their microphone approach for guitar to me as follows: "We use an SM57 and a 421 on the cab, and actually use more of the 421 in the mix.")

As a rule, you won't want to put your amp in a big-sounding room and mic it up from a distance; to achieve the tightness and focus required for heavy rhythm guitar tracks, stick to close-miking your cab, usually no further than seven or eight inches from the grille cloth. Once you have got your source sounding great, it

should also sound right with the correct microphone placed in the right position. If it doesn't, move the mic around until it does. As with the bass, it is well worth experimenting to find the best-sounding speaker in the cab.

A recommended starting point when it comes to mic placement on a guitar cab is with the mic half-on and half-off the speaker's dust cap, at around half an inch from the grille cloth. From here, listen to the sound in the control room and check for two issues. Is the tone too bright and fizzy (particularly compared with how it sounds in the live room)? If so, move the microphone away from the dust cap towards the edge of the speaker in small increments — maybe up to an inch at a time — until it sounds right. Secondly, and very importantly, is the guitar sound 'boomy' and 'loose' in the low end? You can focus in on this issue by damping the sixth string while chugging, or playing fast picking patterns on this open string. If there is a problem, start backing the microphone away from the speaker, thereby diminishing the proximity effect. Again, small movements will have a profound effect on how tight the bottom end of the guitar tone is, and this is an essential aspect of getting the sound right, particularly when you consider the amount of open sixth-string picking and fast riffing going on. On albums where the guitars have been tuned down to 'B', or even 'A', I have sometimes had the microphone backed off from the grille cloth by as much as six to eight inches in order to get the low end right. The importance of the distance from the mic to the source when recording down-tuned rhythm guitars cannot be overstated.

If you are double-miking your guitar cab, it's worth experimenting with placing one of the mics off-axis. This will help vary the tone between the two mics (off-axis tones tend to be duller), helping them track up better when these two sources are used together. My own method of choice is to double-mic the best speaker in a cab with either a pair of 57s or a 57 and a 421. I place the first mic half-on/half-off the dust cap and the second just off the dust cap, with its diaphragm as close as possible to the first, but slightly off-axis and pointing in towards the centre of the dust cap. With the two diaphragms being right next to each other, there shouldn't be any noticeable issues with phase cancellation. From this starting point I would adjust the mics as explained earlier. The different

tones from the off-axis placement of the second mic, possibly combined with this being a different make/model of mic, will yield numerous options when it comes to mixing. For more on phase correlation when double-miking guitar cabs, see *Sound On Sound* January 2009.

A common mistake that many guitarists, engineers and producers make when recording guitar parts for extreme metal is to choose an overly 'scooped' sound with very little mid-range. A lack of mid-range will usually lead to a very thin sound with a lack of body, weight and size. It is usually a better option to dial in slightly too much mid-range when recording and, if appropriate, tone it down with EQ at the mixing stage.

Avoid using the overdrive from cheap and nasty multi-effect processors as the basis for your tone. If you are working with a valve amp, use the amp's natural overdrive as the foundation of your sound. However, a great trick for tightening up the bottom end of a down-tuned rhythm-guitar tone is to use an Ibanez Tube Screamer pedal set up so that it isn't actually adding any drive, level or tone in any way. Simply running your signal through the pedal will noticeably tighten up the low end.

It is usual for productions in the metal genre to have a minimum of two rhythm guitar tracks per side (ie. two rhythm guitars hard left and two tracks hard right). Occasionally, however, bands record just one guitar each side where their riffs

## One Vocalist, Two Mics

Properly capturing the wide dynamic range of a metal vocalist can be a problem. Corey Taylor from Slipknot, for example, sometimes goes from a whisper to a full-on scream within a single line. This can make it challenging to get a sufficiently intimate vocal sound and full recording level on the quieter sections. I will often compress vocals when tracking, but even this won't necessarily capture the subtleties of the performance correctly. To deal with this, and to allow for continuity of vocal performance, set up two microphones at different distances from the vocalist and record them on separate tracks. The closer of the two will be used for the quieter, breathier sections, with the mic gain set accordingly. Chances are that on the louder sections, the recording from this close mic will clip as a consequence, but the other recording should have a perfect level for the louder section. This option of moving between the two mics allows for a lot of flexibility during the mix.



Metal vocalists often operate over a huge dynamic range, and it can be beneficial to record two microphones: a close mic for the intimate, quiet moments and a distant mic for full-on screaming.

are too fast and rhythmically challenging to track up accurately.

Another common mistake is to use too much overdrive or distortion when layering guitars, leading to a loss of note definition. If you get the chance, experiment by backing off the gain, tracking up four guitars and analysing the resulting tone, focusing on low-end definition and clarity.

When layering guitars, experiment with varying the sounds between takes, as this can provide better frequency coverage and a stronger guitar tone. Two great-sounding guitar tracks with varying tone will be likely to sound bigger than the exact same sound tracked up. This can be achieved in various ways: using a totally different guitar rig, the same guitar and amp but a different cab, or perhaps the same amp and cab but a different guitar. Alternatively, a different placement and/or mic can sometimes be enough to vary the tone for this purpose. If the band has a twin-guitar line-up, care needs to be taken to retain the tonal identity of the two separate players.

## Vocals

A high-quality condenser mic is the most obvious choice to capture and translate the powerful growls and throaty low-end of an aggressive voice. However, there is not one microphone that works for everyone: some extreme metal vocalists will require a warm, full-sounding microphone, while

others may suit an edgier, brighter mic, so it is well worth recording the same vocal take through a number of different mics and comparing the results. You can also maximise the variation of tones between aggressive and clean parts and styles by using different mics for each, and varying the mic used when tracking up or harmonising vocal lines will help to 'thicken' up the overall vocal tone.

In metal singing styles, popping as a result of breath blasts from 'p' and 'b' sounds striking the mic diaphragm can seriously compromise vocal recordings. Using a pop shield placed at least three inches away from the vocal mic will help make sure that these breath blasts are diffused properly, as well as keeping the vocalist the right distance from the mic.

There are some vocalists who are just never going to give their best performances standing still in front of a pop shield. If the vocalist feels that this ruins his or her ability to perform, it is always preferable to have a great vocal performance with a slightly inferior sound than a poor vocal performance with a great sound. In this case, use a hand-held microphone such as a Shure Beta 58 and get the vocalist to concentrate on maintaining good microphone technique whilst committing to his or her performance.

## Parting Shots

As a general principle, even in extreme metal genres where the use of samples and editing is commonplace, a production that has a relatively faithful and honest reproduction of the original tones and performances will usually sound a lot more impressive than one that has been heavily manipulated and processed. The closer the sounds you capture are to the tones you'll eventually be seeking in the mix, the more natural the results will sound.

Also, although the technical aspects of engineering are, of course, important, the ultimate quality of a production has much more to do with the band's musicianship and attitude and the commitment of the performances involved than, for example, the type and position of the microphones used to capture this. Again, a producer's personal talents and his ability to motivate and inspire the musicians and their performances cannot be underestimated.

In next month's article, we'll look at the approach you need to take at the mix to complete a professional-sounding extreme metal production. **SO3**

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## **Item 5**



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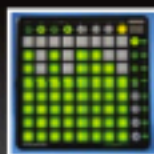
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# Mixing Metal

## The SOS Guide To Extreme Metal Production: Part II

In the second part of our masterclass on the production of modern metal music, we explain what makes a great metal mix.

*Mark Mynett*

**T**he way music is balanced, equalised, processed and effected has an overwhelming impact on the way it is perceived. In extreme metal, a good mix is usually characterised by hyper-realism of performance and tightness of production, with a particular emphasis on low-end definition, overall clarity and intelligibility. Despite the fact that each mix will present its own specific challenges, this article aims to explain basic techniques that are common practice within the genre. With time and experience, these will serve as a starting point for developing your own personal mixing style.

Mixing is a creative process, and it's important that you aren't continually distracted by technical issues. So it's a good idea to carry out all the technical preparation on your files before getting stuck in. Start by getting rid of any unwanted audio from your project: for unwanted sections where toms are not being used, as well as incidental bass and guitar string and amp noise, waveform edits with appropriate fades are a lot more accurate than trying to get manual gates to operate correctly. If you're going to be using samples to replace or reinforce your drum tracks, now is the time to add them (see 'Drum Samples In Metal Mixing' box).

### Time Alignment & Phase

Paying attention to phase issues can often make the difference between a clear, well-defined mix that has a heavy yet tight low end, and one that is thin, with poor intelligibility. Start by ensuring that your various kick-drum sources (multiple mics and samples) are phase-coherent, by fading

each source in with one of the kick mics, and comparing this without, and then with, the phase inverted. Usually, one of these settings will provide a much thicker, fuller low end, and clearly this indicates phase summation.

After doing the same with your individual snare tracks, I can recommend that you spend time experimenting with time-aligning your overheads to your snare spot mics. It is amazing how much difference bringing the overheads just two or three milliseconds earlier in the digital domain will make to the overall body and tone of the snare when these sources are combined, due to improved phase coherence. Simply line up a significant transient on your overheads to the same transient on your snare top channel by zooming right in to the waveform display as far as possible, then physically shift the overhead audio files earlier so that this transient is starting at exactly the same point. Room mics can likewise be time-aligned to your snare spot mics.

As phase cancellation is a very common problem with a multi-miked kit, all other spot mics should now be checked against the overheads for phase, and polarities reversed if appropriate.

Like sample reinforcement, re-amping the bass guitar is common place in metal mixing. However, a common mistake is the failure to realign the re-amped track to the DI, to take into account the delay introduced by this signal path. Even a couple of milliseconds is enough to introduce comb filtering, which will thin out the bass sound when the re-amped cab is combined with the DI. You can make this realigning task a lot easier by flying in a signal with a sharp transient attack (such as a cowbell) before the start of the DI track before you re-amp. Afterwards, simply zoom

into the cowbell's waveform on the re-amped track, and time-align this to exactly the same point on the DI track.

Even if re-amping has not been used, it's usual to record at least one DI and one amped bass track, so there is still the possibility that time-alignment/phase issues will need addressing. Use the DI signal as the central reference. Once all the individual bass channels are time-aligned and reinforcing each other, make sure that the collective bass sound is phase-coherent with the kick drum; failure to get this right will result in a vastly weakened low end.

If you have double-miked your guitar cabs for each take, and the diaphragms were placed as close as possible to each other, there shouldn't be any phase issues here; and as any re-amped guitar tracks will not be combined with the DI source, it is not so vital that these are time-aligned.

Although checking all these phase issues may seem rather time-intensive, it's invariably time well spent.

### Grouping The Groups

At this point, your session should be edited, time-aligned and fully phase-summated, with the snare, kick, toms, bass and guitar gated or edited and the samples lined up. You can now set up any mix groups you want to use. Remember that using equalisation and compression on individual channels can give very different results from using the same processes on groups: for example, applying EQ to four rhythm guitars separately will provide a profoundly different tone from applying a single EQ across the whole rhythm guitar group.

All producers will have their preferred approach, so instead of stating my own preferences, I would rather emphasise the importance of experimenting with the various options, by exporting relevant sections and A/B'ing the results. However, I definitely would not recommend processing your kick drum and bass guitar on the same group, as I have heard suggested by some people. Boosting or attenuating the two instruments at the same frequency will increase the likelihood of an unnatural accumulation, or gaps, in the frequency spectrum.

### Finely Balanced

As ever, the most important element of mixing is balancing the relative levels of all the instruments and, if necessary, using automation to control them. It is very hard to generalise about balance levels, because,

obviously, every mix is different, but we can give a few guidelines that usually apply to extreme metal mixes.

First, contrary to popular belief, red lights from level peaking are not a sign of virility when mixing loud, powerful music! As a general rule I recommend keeping at least 6dB of headroom right across the board on individual channels, groups, effects auxiliaries and the master bus.

To achieve the required tightness of sound, the drum sound will usually be dominated by the spot mics, so be careful not to overplay the level of your overheads and any room mics. Overdoing the overheads will very quickly lead to an abrasive mix that will soon tire the ears of the listener. It is usually appropriate to make the kick drum(s) slightly higher in volume than the rest of the kit: not only is the weight and presence of the kick essential in providing a strong foundation to the mix, but the kick tends to get pushed down when overall mastering compression is applied — as, to a lesser extent, does the snare.

Bass guitar often tends to get overshadowed by the drums and rhythm guitars, and again, master compression can exaggerate this, so bear in mind the likely effect of any mix processing when you're setting bass levels.

Vocal levels need to be determined by the style and type of performance. Some bands I've mixed have actually requested that the vocals be given less prominence, to divert attention more towards the grooves, guitar riffs and general power of the instruments. In this situation, try overdriving the vocals using a plug-in such as Digidesign's Lo-Fi.

The best extreme metal mix engineers in the business have developed an uncompromising dedication to detail, and as you get more experienced and proficient at mixing, so will you. Examples of paying attention to detail might include riding up the overheads to provide additional energy during choruses, automating big reverbs on key snare or floor-tom hits, riding certain bass notes or phrases, and emphasising pinched-harmonic guitar squeals and vocal segments with long, panning delays.

## Panning & Stereo Width

Good stereo width, which will provide a big soundscape, is essential. However, you need to be very careful that this is not to the detriment of the centre of the mix: when instruments are panned inappropriately wide, the centre can sound unfocused and slightly detached, with an apparent hole in the middle.

First of all, think about how wide your

## Listen For Yourself!

All the screenshots for this article were taken from my mixes for modern metal acts For Untold Reasons (left: [www.myspace.com/foruntoldreasons](http://www.myspace.com/foruntoldreasons)) and God-sized ([www.myspace.com/god-sized](http://www.myspace.com/god-sized)).

Audio examples demonstrating these settings and the techniques discussed in this article can be found on line at [www.soundonsound.com/sos/dec09/articles/metalaudio.htm](http://www.soundonsound.com/sos/dec09/articles/metalaudio.htm).



overheads should be panned to provide as realistic a perspective as possible, avoiding excessive movement across the stereo field.. From here, ideally, the panning of the tom mics should mirror their perceived positions in the overhead mics. In many instances, a more natural focus will be provided by bringing the pan position of the overheads inwards slightly, which has the added bonus of leaving the extremities of the stereo field free for the rhythm guitars.

## Equalisation

Before getting into detailed discussion about equalisation, I firstly want to present two errors that many novices to the metal genre, make with their EQ decisions. One is the tendency to focus on only boosting rather than attenuating frequencies. This will, of course, increase the overall level of the audio, which can mislead us into thinking that it sounds better when it doesn't. Boosting has its place, but it's important to remember the value of

corrective attenuation. For example, cutting with a tight (higher) 'Q' setting can remove, or significantly reduce, resonant or undesired frequencies. It might not be as 'ear-grabbing' as a big boost but it may be more effective.

Another novice error is to spend too much time manipulating and fine-tuning EQ choices while assessing the individual instruments or audio tracks in isolation. This can be useful, particularly when finding unwanted resonant frequencies, but audio always needs to be judged in context, and this is never more so than when dealing with the heavy, dense tonalities of extreme metal. Therefore, the impact of your EQ decisions as they sound within the mix should always take priority.

## Filter Away

One of the biggest challenges in modern metal production is getting the low end of the mix right. In striving for a 'heavy' production, many mixers will excessively amplify the wrong low-end frequencies, resulting in

## Drum Samples In Metal Mixing

Due to the consistent dynamics, power and attack required, one of the distinctive aspects of extreme metal production is the widespread use of drum samples. Usually, this will just be for the kick and snare, but occasionally for the toms, when required. There is always a balancing act: samples should contribute to the right drum sound, but without the performance sounding as though it has been programmed. Provided the live drums have been properly recorded, most producers will prefer the more natural-sounding approach of using samples to reinforce or augment the live tracks, rather than replacing them altogether.

Although I sometimes combine them with other pre-prepared samples, I will predominantly use drum samples taken from the kit used for recording, as these will interact with the spot and overhead mics in a much more natural way. In last month's article I recommended spending time preparing different combinations of the spot, overhead and room mics when bouncing down to create these samples. It is at this stage that you should take time to experiment with how these different samples work within the context of the relevant spot mics and the overheads. The tempos, style and speed of the drum performance will also have a large bearing on sample selection: for example, it would be inappropriate to use a really ambient snare sample for a thrash-style

track, or where blast beats are used.

We saw last month that it is worth recording the output of drum triggers if you can. These are very useful for implementing samples, or opening gates via side-chains, as they will have less bleed-over than conventional mics. If you are forced to use the close-miked kick and snare tracks as sources, it's worth taking some time to ensure that hit points aren't being missed, and checking that samples have not been added where they shouldn't be.

There are several ways of implementing drum samples. Some producers prefer to use the Tab to Transient feature in Pro Tools to paste each sample in manually, while others use software packages such as Sound Replacer, TL Drum Rehab and Drumagog. Whichever method you use, it is absolutely essential that the samples are perfectly lined up and in phase with the live drum hits. Outside of quiet sections, use minimal or no sample dynamics whatsoever on the kick, and if your drummer used two separate kick drums rather than a double-kick pedal, tune one of your samples slightly differently, to provide an element of differentiation between the two.

One of the main indicators of poor sample use is lack of dynamics on snare rolls, so this is an area where time will need to be spent either on getting the dynamics to track those of the performance, or using volume automation to introduce variation.

► an uncontrolled, boomy and flabby mix. Alternatively, a production with a deficiency in the right bass frequencies will lack impact and sound thin.

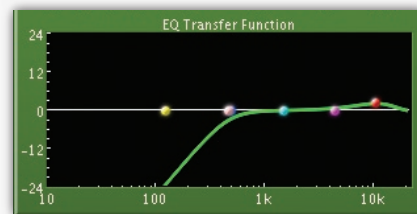
One of the keys to getting this aspect of the mix right is to create a very specific space for each instrument to sit and breathe. This will partly be achieved by avoiding masking: the tendency of one sound or instrument to obscure, or inhibit another in the same frequency region. This is particularly important in the low end, where getting the bass right is not so much a case of boosting low frequencies as of removing inessential energy in this region, so that instruments that need to sit here have space to 'breathe' in.

To achieve all of the above, I can't stress enough the importance of integrating high-pass filters (HPFs) into your equalisation decisions. When these are used correctly, the treated instruments will be perceived as being louder and more defined, and there will be more clarity in the overall mix. I will often use HPFs on every single instrument, and the busier the mix, the higher the corner frequency that will be selected for each filter. Particularly for a dense, Dimmu Borgir-style production with fast double kicks, blast beats, string sections and keyboards, extensive and

aggressive use of HPFs is necessary to help retain intelligibility for all these instruments.

As a general rule for mixing extreme modern metal, I would use an HPF to remove anything below 60Hz right across the mix, and would avoid boosting anything in the 20-60Hz sub-bass range, which invariably will wreck a mix for this genre. Obviously, every instrument in every project will have vastly differing frequency content, and although you can't use a formula when applying high-pass filters, I will present the following as a general guide.

For kick and snare, an HPF will be used to remove everything below the lowest desirable frequency. With the kick, this can be anywhere between 60 and 80Hz, depending on the style and speed of kick pattern (low frequencies on kick drums have a tendency to 'build-up' with quick kick drum work), while on the snare it would typically be between 110 and 170Hz. A large floor tom would be treated in a similar manner to the kick, with the cutoff frequency higher on smaller toms. I frequently have the HPF on the overheads and hats as high as 550Hz, but lower, around 400Hz, for the ride. Room/ambient mics can have an HPF set anywhere between 80 and 250Hz, dependent on what you want them to bring to the mix.



Tonal control over each separate element of the drums is essential for gaining the punch and clarity required. The overhead mics are thus not used so much to provide an overall 'picture' of the kit, but more as spot mics for the cymbals. With this in mind, the HPF on the overheads and hats can be set as high as 550Hz. Getting this right can easily be done by concentrating the ear on the high-frequency content while slowly moving the HPF up until it starts thinning out the cymbals or hats, then moving the setting back slightly. A slight boost in the 10-12kHz region has been applied in this screen shot to add some definition and brightness.

The bass guitar HPF I will usually leave at 60Hz, dependent on how busy the bass performance, kick drums and mix in general is. It is essential to remove the cabinet thump and resonant low-end rumble from rhythm guitar tones, and depending on what key the guitars are down-tuned to, this will involve an HPF set anywhere between 65 and 105Hz. Vocals very rarely have any content below 85Hz, and the HPF can usually be set a lot higher, perhaps around 160Hz, depending on the tone and style of the vocalist.

Although they are used nowhere near as frequently as HPFs, low-pass filters can also be implemented to remove high-end noise or hiss, and can also be used to mark the highest usable frequency. For example, rolling the bass off above 7/8kHz can help minimise masking and therefore increase separation.

## Intelligent EQ

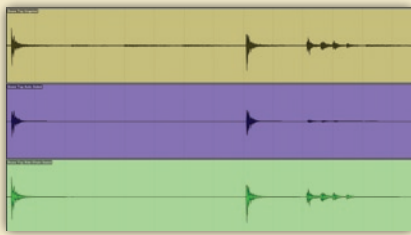
Having removed unwanted frequencies, you can now use additional EQ and balancing to pick out the tones that really matter. However, before discussing some frequency guidelines for specific instruments, I first want to mention three general principles that can be highly effective.

- To gain a louder, tighter and more powerful mix, avoid simultaneously amplifying or attenuating the same frequency on too many different instruments. Boosts at the same frequency on multiple instruments have the tendency to accumulate, and sound unnatural and unpleasant, with an unpredictable overall mix level due to the resulting 'loud' region created in the frequency spectrum. Likewise, making the same frequency cuts on multiple instruments can result in an artificial-sounding ►



## Drum Samples & Side-Chain Gating

I've found that there are limitations to the effectiveness of automatic noise gates within various music production platforms. They can be inaccurate and unpredictable when it comes to opening fast enough to allow the wanted audio through. Some gates have a 'look-ahead' function, in a bid to combat this issue, but often

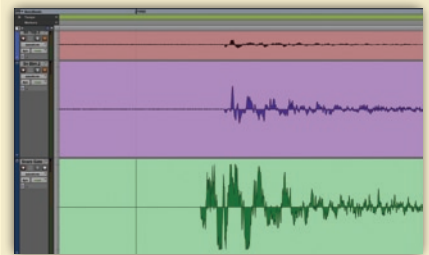


In this screen shot, the top (brown) channel is the un-gated snare top mic. The centre (blue) channel is the same signal, but with inaccurate auto-gating applied. The bottom (green) track shows the same section, but with side-chain gating applied. As we can see, the auto-gating has affected the crucial transient attack of the first snare hit, and severely truncated the buzz-roll occurring after the second hit.

with mixed results. These shortcomings mean that, as you will see from the screenshot on the left, the transient attack of a drum hit can get slightly truncated. The first few milliseconds of a drum hit are absolutely essential to its attack and definition, and any 'softening' of a drum's attack is obviously unacceptable in an extreme metal production.

The good news is that once you have lined up your kick and snare samples, these can provide a reliable source to feed the side-chain input of your kick and snare mic gates. Simply copy all of your kick or snare samples to a new track and collectively move them 10 milliseconds earlier to provide the gate with just enough time to accurately open and allow through the all-important transient attack. You don't want to hear this duplicate sample track, but it should be routed to the side-chain input of the relevant gate.

Set the gate quite tight, with the range at maximum, so that nothing is heard when it's closed. Heavy gating facilitates absolute tonal control over each separate element of the drums, which will be essential to gaining the punch and clarity that is required.



Highly accurate gating, without the risk of truncating the all-important transient attack, can be achieved by copying the already implemented drum samples to a new track, moving these 10 milliseconds earlier, and then feeding them to the side-chain of the relevant spot-mic gate.

One last point on side-chain gating: now that your kick and snare side-chain gate sources are in place, these can be used to experiment with side-chain gating room mics you have recorded, to allow just the kick or snare ambience through. This can provide a different impact from using room mics in a standard way, helping add weight, punch and size to kick and snare spot mics.

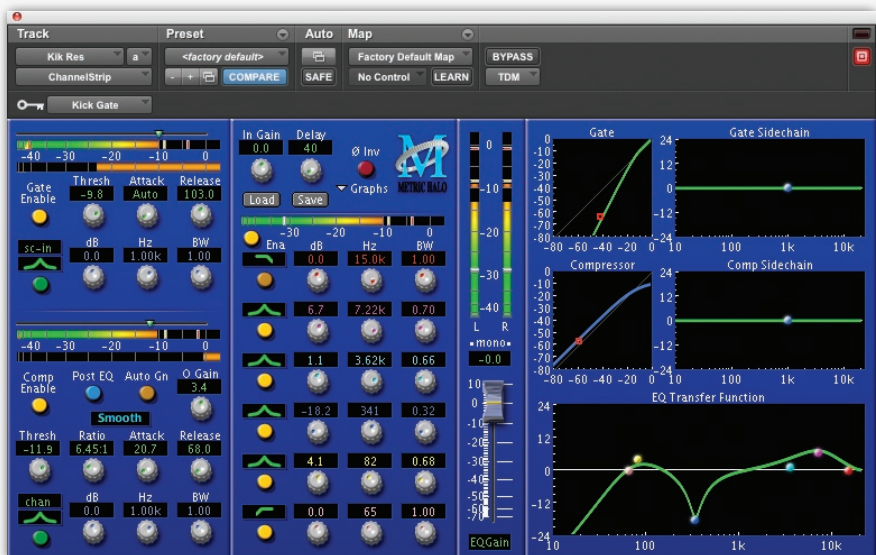
- ▶ 'gap' in the production's frequency range, making the mix unstable on different systems. So, for instance, you would usually avoid amplifying or attenuating both your kick drum and bass groups at the same frequency, and avoid boosting or attenuating the same frequency across all the different kick and bass tracks. By varying the frequencies being amplified and attenuated, you will achieve a more balanced tonal distribution and a louder, heavier mix as a result.

- Think about attenuating instruments that are masking, rather than boosting the one that is being masked. For instance, a snare may lack impact because it is being masked by other instruments around the 200Hz region where, generally speaking, the body and weight of a snare is. Rather than simply amplifying the snare at 200Hz to fight the other instruments for this range, and in the process cause an unnatural accumulation of frequencies here, you should experiment with attenuating the 200Hz region on the instrumentation that is masking the snare.

- On the same principle, it is worth experimenting with 'mirroring' your EQ choices, whereby the amplification of a certain frequency on one instrument is paired by the attenuation of the same frequency on another relevant instrument. By doing so, less gain can be used whilst achieving the same impact of a much greater boost, and generally speaking, the audio will sound less processed and much more natural as a result.

To use an example, whether you are dealing with the growls of a death-metal vocalist or a performance featuring high-pitched screams, the vocals are predominantly going to be in the mid-range. In the battle to achieve as big a guitar tone as possible, you may have

problems in gaining proper vocal clarity and intelligibility if there is not enough room in the mid-range for the vocals to sit. Find a frequency range in the vocal sound which contains pleasing tonal characteristics, and combine EQ boosts to accentuate this



This screen shows typical metal kick-drum EQ and compression settings, with gating taken care of via a side-chain. Similar EQ settings could be applied to a kick sample prepared from the same kit. A high-pass filter at 65Hz minimises inessential low-end energy, while a parametric boost at 82Hz, with a medium 'Q' setting, emphasises the 'right' band of low frequencies. The third band is extensively attenuating unwanted frequencies around 341Hz, providing more definition and clarity and freeing up space for the bass guitar to 'breathe'. Finally, a fairly gentle boost at 3.62kHz and a larger one at 7.22kHz emphasise the attack. When an even more cutting impact is required, the boost at 7.22kHz could be replaced with one at an even higher range, around 9-10kHz. The compressor's attack setting is allowing the initial transients of the kick drum through untouched before clamping down on the body with a relatively high ratio – again, helping to emphasise attack.

### Listening Levels & Environment

Given the power and volume levels that are associated with metal, it is tempting to predominantly mix at a loud level. However, the best way to assess the instrumental and frequency balance of a mix is actually to not only listen at different levels, but also on many different systems (including car stereos and headphones), in different environments, and even in different listening positions within these rooms.

- ▶ with attenuation of the same range on the rhythm guitar group.

### Where The Meat Is

As already stated, every instrument in every project will have vastly differing frequency content. Therefore, although the following can be used as a rough guideline, your decisions should clearly be informed, above all, by the frequency content of your source material.

#### ■ Kick Drums

The fundamental low-end weight of a kick drum will usually be around 60-110Hz. However, avoid amplifying any frequencies lower than 75Hz, as this will usually result in a mix-wrecking accumulation of boomy frequencies, particularly on sections with fast double-kick patterns. To provide more clarity and definition to your kick, whilst additionally freeing up a space and a place for the bass to breathe in, there is usually some unwanted energy in the 250 to 450 Hz frequency range that can be aggressively attenuated. The all-important click of the kick drum is usually found either at around 4kHz or an octave higher at around 8kHz; the latter, in particular, often needs to be dialled in to provide maximum clarity for fast double-kick performances.

#### ■ Snare Drums

Although there is little that is specific to extreme metal when it comes to EQ'ing snare drums, it is worth mentioning that, generally speaking, the weight and body of a snare is centred around 200Hz-450Hz. Amplifying parts of this range will thicken up the snare tone, and cutting will produce a brighter snare with more of a 'crack'. There are often also some 'boxy' frequencies between 175 and 500Hz, which should be located by sweeping around in the normal way and then attenuated. To further increase a snare's attack, boost around 4-8kHz or accentuate the rattle of the snare wires around 10-12kHz.

#### ■ Hats, Toms, Ride & Overheads

Other than making sure that your toms have the requisite weight and attack, there is

little here that is specific to the genre. Any necessary brightening up to provide definition for the kit's 'metalwork' can be added using a broad, gentle boost around 10-12kHz. Any harshness in the overheads is usually located in the 3-6kHz region.

#### ■ Bass

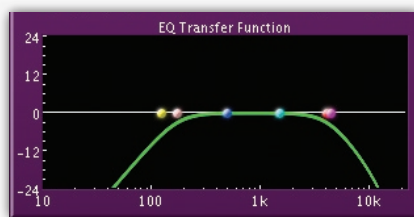
As discussed in last month's article, recording a channel of bass amp simulation is an excellent way of getting an alternative tone and coverage of frequencies to strengthen the DI and mic combination. Additionally, a channel of distortion will provide separate control over the driven element of the bass sound: experiment with removing the abrasive high end and muddy lows this distortion can produce by using high and low-pass filters at around 250-400Hz and 2-5kHz respectively.

Lack of bass guitar in the mix seems to be the hallmark of most amateur metal productions. The distorted element helps to get more volume from the bass without it sounding inappropriately loud, as it gels better with the guitar tones. The attack, note definition and presence of a bass guitar can often be emphasised by boosting around 2-3.5kHz. A clearer, less woofy bass tone with accentuated lows and highs can be achieved by using corrective EQ on the bass group in the low mid-range around 200-450Hz where the guitars may be fighting for space. Experiment with widening the 'Q', but avoid heavily attenuating the same frequency ranges on bass and kick drum.

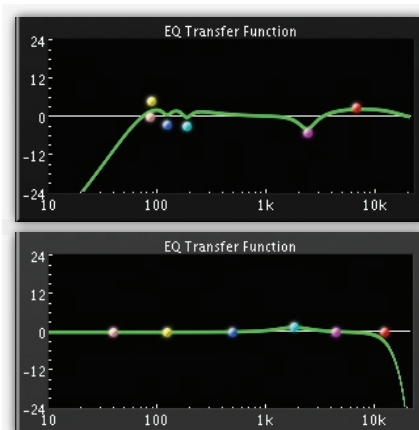
#### ■ Guitars

Avoid the tendency to immediately try to dial in a lot of low frequencies for the rhythm guitar tracks, as this is one of the surest ways of ending up with a muddy, flabby low end to a mix. After setting the HPF as appropriate, it is generally inadvisable to focus on amplifying the 65-80Hz range; after all, the guitar is not a bass instrument, however much it is tuned down! A tighter tone with stronger note definition can usually be achieved by boosting slightly higher, at around 85-120Hz.

The mid-range of guitar tones, where most of the character and personality is found, is



Band-limiting the bass distortion channel can remove the muddy lows and abrasive highs that may be created by bass distortion. The solid bottom end will be provided by the other bass sources.



In this example, I have used eight bands of EQ for rhythm guitar. The all-important HPF has been set to 85Hz — very close to the low-frequency area being boosted, which is 89Hz. Three dips are applied to control unwanted resonant frequencies at 123 and 186Hz, both with an extremely tight 'Q' curve, and 2.39kHz, with a wider 'Q'. High-end brightness is added at 6.86kHz, and on the second screenshot, a slight high-mid boost with a wider 'Q' has been applied at 1.82kHz to compensate for the attenuation at 2.39kHz. Finally, an LPF has been used to mark the highest usable frequency and to help minimise masking; in this instance, it was set to 12.4kHz.

too often overlooked. Heavily mid-scooped guitar tones will often result in a thin-sounding production, but there are often unwanted, resonant, boomy low-mid frequencies around 250Hz as well as 'pillowy' frequencies at around 1.5-2.5kHz, which may need attenuating to keep them under control. If appropriate, a slight boost with a wide 'Q' can then be applied at around 1-2.5kHz to compensate for the upper mid-range cut, helping to provide a thicker tone when required. The essential high-end brightness for rhythm guitars will usually be found between 5kHz and 8kHz.

Having tried many of the hardware and software amp/cab simulators on the market, I still feel that these cannot compare with the more organic and natural sound of the real thing. If you have used a simulator for your rhythm guitar tone, beware of an abrasive high end that can sometimes interfere with the clarity of the cymbals. You can use a low-pass filter to correct this.

#### ■ Vocals

Even if the lyrical content of the band you are mixing is indecipherable, ensuring that the energy and emotion of the vocal performance is translated with clarity and intelligibility is still essential. With this in mind, to make sure that the vocals cut through the aggressive high end of the guitars, you will often need to dial in a lot of high-end brightness around

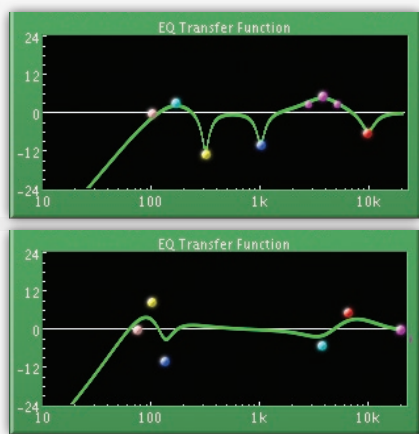
## Master Bus Processing

To ensure that no nasty surprises leap out at the mastering stage, try inserting a compressor or a mastering-style plug-in over your stereo output bus in the latter stages of mixing, but removing this prior to exporting your final mix. This will give you a general idea of what balance and frequency impact mastering compression is going to have. Keep the ratio fairly low (no more than 2:1) with a fairly high threshold, providing no more than 3 or 4 dB of gain reduction.

- ▶ 4.5kHz, and possibly some 'air' at 10-12kHz. However, amplifying this frequency range can often lead to problems with sibilance on vocal tracks, so a de-esser should be inserted over each and every vocal channel before they get EQ'ed. Experimenting with a small amount of overdrive can help the vocal sit better in the context of the mix, by providing a warmer, slightly more aggressive tonal character.

## Compression

The basic principles of compression have been covered in depth in *SOS* recently, so in this article I'll stick to specific applications for metal mixing. Generally speaking, the faster and more intense the performances involved, the more heavy-handed you will have to be with your compression settings. In some instances, for example when going from blast beats to a half-time section, automation will still be required. If you are uncertain about exactly what effect your compression is having on the audio, I can highly recommend exporting the compressed file and examining the waveform. This is great for visualising exactly what the



Heavy attenuation of unwanted resonant vocal frequencies is common to most genres. However, in this instance, mirrored EQ has been used to gain the necessary vocal clarity against huge, down-tuned rhythm guitar tones: the pleasing vocal characteristics around 3.79kHz have been boosted, while the same region has been cut on the rhythm guitar group.

compression is doing, particularly to the source's attack. Similarly, be aware of the impact compression is having on frequency content: badly compressed audio will quickly lead to a muddy mix.

To use a compressor to emphasise a kick drum's attack, set the compressor's attack relatively slow (above 20 milliseconds) so that the initial transients are retained but the body is compressed. Use a fast to medium release and set the threshold fairly low. Conversely, if you want to add more body to, for example, your snare, set both attack and release times really fast (within a few milliseconds), with the threshold set so that it is compressing the snare's attack, but not its body. Although overheads can sound more aggressive with compression applied to them, I personally prefer the pin-point accuracy of uncompressed overheads. However, ambient room mics will usually benefit from very heavy-handed compression.

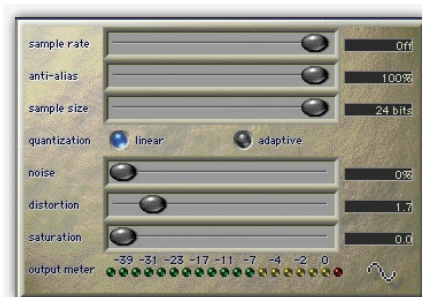
In instances where particularly aggressive levels of compression are required, for example with bass, two separate compressors in series can be a lot more effective at providing a constant perceived level than a single compressor. Different parameter settings should be used on each compressor: for example, the compression on the channel could be set to clamp down on just the peaks of a bass signal by having a high threshold with a fast attack, while a group compressor to which the bass is routed could be set with a lower threshold and slow attack, so that it is compressing the body of the bass sound. Either way, higher ratio levels that are more associated with limiting (8:1/10:1) can often still be required. Achieving a constant vocal level will often require a similar approach, but opt for a very fast attack and medium release.

I rarely compress rhythm guitars, as by their nature, overdriven guitars are already very compressed. If you do feel you need to compress them, opt for a low ratio and slow attack, to retain note definition.

## Effects

My initial advice on the subject of reverb would be to keep it simple, and send many different instruments to just two, or maybe even one, reverb. Using a lot of different reverb treatments will, in effect, put different parts of the mix into many separate spaces, which will probably sound ineffective and inappropriate.

As a general guide for the snare (and to a lesser extent) toms, I would use a short plate reverb with a decay of between 500 and 800 milliseconds and a pre-delay (to set the



A small level of overdrive (in this instance provided by Digidesign's Lo-Fi plug-in) applied to the vocal can provide a warmer tonal character.

reverb away from the initial transient attack) of between around seven and 11 milliseconds. Experiment with the send levels between your snare top, bottom and samples: sending more of the latter can help to provide a really effective stability to the overall snare reverb. Leave the rest of your kit dry, as well as your bass and rhythm guitars.

A drum-production trick well worth experimenting with, when appropriate, is brightening up your reverb return. Try removing the low-frequency content of the reverb return below 200Hz, boosting its presence at around 3-4kHz and possibly adding 'air' at around 10-12kHz.

When mixing a track that features intense performances and dense tonality, I will often opt to keep the vocal track in the same acoustic space as the drums, by bussing them to the same short plate reverb. When there is space to do so, it can be appropriate to use a longer reverb on the vocal, but be very careful with the level applied, as too much can quickly result in a lack of definition. I will therefore apply more delay than reverb to the lead vocal, usually opting for a simple eighth-note repeat. The same vocal reverb and delay will be used for any guitar solos, and I will often have an additional really long delay set up as a special effect for vocals or guitars.

## Conclusion

Of all musical genres, metal is the very last that is acceptable when delivered with poor production. A quick search of MySpace will reveal that there are some absolutely superb musicians and bands out there, with great songs, whose talent, unfortunately, is utterly lost in the appalling production and mixes of their demos. In my opinion, metal is the most glorious music in the world after classical music. Hopefully the techniques, procedures and approaches covered in these articles will enable the quality of your productions to measure up to the music! **SOS**



# SOUND ON SOUND

The World's Best Music Recording Magazine

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# GET THE PERFECT BASS

There's much more to getting a frequency-rich, mix-filling bass guitar sound than you might think. Layering, EQ, compression and more come into play, as our guide reveals

**> Nowadays it seems that producers and mix engineers of all genres are locked in an eternal struggle to get the biggest, fattest drum sounds possible. But massive drums alone don't a great mix make. The industry's highest-standard tunes make sure they do two things: fully exploit the relationship between drums and bass; and carefully sculpt the space and place where the bass sits around the drums and within the whole mix.**

The world's top producers fully understand the vital importance of the drums/bass relationship, particularly concerning the way the kick and bass work together. The importance of this aspect of a mix is one that's frequently underestimated and misunderstood by the novice engineer.

## Back to basics

In this tutorial we'll look at the fundamental principles behind getting a big, tight electric bass guitar tone while retaining note definition and clarity. We'll then explore various processing techniques to ensure that this foundation of your mix - and in particular the way that the bass sound locks and interacts with the kick drum - is optimised.

From there, we'll move on to processing techniques with distortion to make the bass cut through the mix. After that we'll examine how to use distortion to better enable a bass part to sit properly in the mix alongside other instruments. This concept in turn enables the level of the bass to be increased without making it sound intrusive, thereby leading to a bigger production with a fuller bottom end.

Whether you've recorded a live bass in the studio and are mixing files from that performance, or you're using samples, these principles and processes can all be exploited and adapted to your own productions. Once you've heard the difference they make, you won't look back.





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## Recording bass guitar

Before we tackle the drum/bass relationship, we must understand how to produce a top-notch bass tone. The first principle of getting a big bass sound is making sure you capture – or generate – sufficiently rich harmonic content across the appropriate frequency range. A very common misconception is that equalisation can be used to correct deficiencies in the frequency spectrum of a source. In reality, an equaliser can't generate frequencies or harmonic content – it can only amplify or attenuate those that already exist.

The traditional route to acquiring 'coverage' of these required frequencies, and therefore giving the right size and definition to the bass sound, is to combine the DI (Direct Injection – the feed taken from plugging the bass' jack output directly into a preamp) with the miked sound from an amplifier and bass cab.

Let's consider what each of these two sources bring to the overall bass sound, then reflect on the principles behind why combining them is effective for mixing purposes.

### Lethal injection

The DI signal is unquestionably a prerequisite of any serious bass recording. If you don't track this essential, core element of your bass sound, it will inevitably mean that you're unable to go down the reamping route, or severely limited in terms of the software that you can effectively use for tonal modification.

How good a DI sounds at the tracking stage is an excellent indicator of the standard of sound likely to be achieved when the signal is translated through a bass amp/cab/microphone or software emulation of the same. At this early stage, you're looking for clarity of notes with minimal fret buzz and fullness, and punchiness of tone. Many producers will check the sonic merits of a bass DI before they even begin to consider the amp and cab to which this signal will be routed.

Using a microphone to capture the physical movement of air from a bassist's cab and amp rig will give you the player's sound according to

what they're used to hearing. Unlike a DI signal, bass amps don't have a flat frequency response, providing extended low-end frequencies and featuring an EQ section for overall control. Many valve or hybrid amps will enrich the harmonic content of the bass sound through distortion; and even if you're using a solid-state amp, a bass cab's speaker cones produce and add rich and complex 'distortion' to the sound, due to the manner in which they move. They also have the pleasant effect of rolling off a lot of the more undesirable high frequencies from the DI signal, which are there partly due to its limited frequency response.

### Classic combination

So, the traditional route to acquiring sufficient and rich enough harmonic content across the appropriate frequency range is to combine a

"The experience of many is that solely relying on the DI/mic combination results in a bass tone that falls short"

DI signal with a mic signal, in order to get two qualitatively different bass sounds for balancing, processing and manipulating during the mix.

One error frequently made by the novice is failing to compensate for time delay differences between the DI and mic channels. These are often due to the differing cable paths involved in each. Despite the fact that this delay is likely to be relatively minimal in terms of milliseconds and samples, it could still result in comb filtering, causing a 'hollowing out' of certain frequencies. To correct this, simply zoom in on a significant transient on both tracks and align the mic signal waveform to the DI one so that they're perfectly synchronised. (You can even find plug-ins to do this for you, such as Sound Radix's Auto-Align, which scored 9/10 in **cm157**.) Needless to say, the

### DI characteristics and Mr Munson

Three adjectives often used to describe DI bass recordings are 'boxy', 'wooden' and 'rattling'. This is partly due to the DI signal predominantly consisting of mid-range combined with some higher harmonics, but also because it's just the clean, pure sound of the bass, and therefore significantly affected by fret and string rattle, as well as the sound of the bassist's fingers moving over the strings. Nevertheless, the DI signal is a crisp and tight tone, and will contain an essential note clarity and 'wiriness' in the mid-range that will usually prove to be a vital component of the composite tone, despite the fact that the DI may not contribute to the overall tone level-wise as much as your other bass source(s).

With the exception of minimal arrangements or particularly thin instrumentation, perhaps the most easily relatable way to consider the DI signal is that regardless of the quality of the bass guitar, the musician's performance and the mic preamp, the result will lack depth, punch and power when combined with other instruments, particularly when the mix is referenced at lower volume. This is due to the 'Fletcher-Munson effect', which essentially dictates that humans do not hear low frequencies and extreme high frequencies as well at low volumes as they do at high volumes.

### Which two-channel combo is best?

The first alternative to the DI/mic combination that many will opt for is simply to replace the amp/cab and mic part of the equation with an emulation of the same. Today's bass amp simulation software is arguably more successful at replicating the inherent nonlinearities of an amp and mic combination (due to power amp response, cabinet resonance, speaker cone break-up, etc) than when attempting the same for guitar. From nothing other than a reasonably well-recorded bass DI, a skilled engineer with access to the right software will have no

problems building a bass tone boasting all the requisite low-end fullness and tightness along with the essential note clarity and definition, without the need for reamping.

In this scenario, the advantages of using emulation software to replace the mic, amp and cab are numerous. The first benefit is that the standard of the acoustics in your studio's live room becomes irrelevant, as does the quality of your microphones and preamps. Additionally, you can choose to change the make and model of amplifier, the equalisation, the

drive and all relevant settings when mixing. This can be a considerable advantage during the mixing stage, as the clarity, definition and overall sound is manipulated at source, rather than on a recording of the source.

Despite this, many bassists, as well as producers, believe that the main disadvantage of such software is that you can't perfectly replicate the sound of the amp being emulated, and that the feel and dynamics of amp/speaker modelling are inferior to the real thing. Our advice: try both techniques and let your ears do the work.



## Adding electronic layers

Let's look briefly at the bass requirements for electronic music. Basslines with sufficient and rich enough harmonic content across the appropriate frequency range in dance and electronic styles can usually be made through layering multiple synthesised or sampled sounds. Each of these various layers can come from a different source, but they should still come across as a cohesive tone, rather than separate elements. This can be achieved by sending your individual layers to a bass sub-group or auxiliary channel and collectively compressing the composite sound to 'glue' them together.

When treating these separate layers for your mix, experiment with assigning each to one of either three

or four frequency ranges: bass, mid and high (20-200Hz, 200-2kHz and 2kHz+), or sub-bass, bass, mid and high (20-100Hz, 100-200Hz, 200Hz-2kHz and 2kHz+). If you go down the sub-bass route, however, ensure that your monitor setup includes a subwoofer and that heavy compression or limiting is used.

With the advantage of independent level control over the sub-bass and bass elements of the composite bass sound, you have a vital edge when it comes to mixing.

The frequency ranges given above are intended as a rough guide, and you should experiment with the filters used to band-pass them, particularly with regard to how they impact on the mix when crossing over each other.

collective phase should still be checked and the mic signal inverted to reinforce the DI signal if that's felt to be necessary.

For most situations, the DI/mic combination will deliver the right ingredients for a mix, resulting in a bass sound that won't be killed at lower playback volume.

## The next step

When taking the traditional route outlined so far, the experience of many is that relying solely on this bass DI/mic combination results in a tone that falls short of the huge, punchy bass sounds being achieved on the world's top productions. The ever-advancing standards and ever-greater heights that today's producers are reaching constantly raise the bar for what can be achieved sonically.

The next step towards achieving these huge bass tones is to add a 'third element' to the DI/mic combo: a channel of appropriately manipulated bass emulation. When controlled correctly, this will provide an alternative tone that reinforces the other components and supplies better harmonic coverage by packing a fuller low end (preferably without losing the essential tightness of the sound) and perhaps a definition and clarity of tone that the DI and mic signals might be missing.

The advantage of this technique is that you can manipulate your bass emulation software to a very great extent. Although it is worth initially fine-tuning this channel of bass emulation in isolation from other sources, priority should be given to getting the tone right when it's heard in context with the DI and mic. In many instances, it will be quite surprising what the optimum tonality of this channel will be in order to reinforce the DI and mic best. Frequently, it will be far from the sort of sound that you would go for when dialing in a bass tone in isolation. But what producer doesn't like sonic surprises? Experiment to see what fits your production.



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## One step beyond

What do the following songs have in common: The Beatles' *Think for Yourself*, Jamiroquai's *Deeper Underground*, Red Hot Chili Peppers' *All Around the World*, Muse's *Time is Running Out*, Ben Folds 5's *Jackson Cannery*, The Prodigy's *Fuel my Fire*, and Us3's *Cantaloop*?

In all of these tracks, the bass sound involves the use of distortion, regardless of whether it's a live performance, samples or programmed. The use of distorted bass on album productions can be traced right from the mid-60s through to modern day dance music, where the majority of mixes feature this particular type of processing.

A common mistake made when capturing bass distortion is attempting to do it when recording the main body of the bass sound - usually the amp/cab tone. This will frequently result in a far from ideal bass tone, as it's very easy to get the distortion settings wrong when applying them to the bass away from the context of the other instruments.

The vastly preferable route is to either record a completely separate channel of distorted bass by splitting the DI signal to an appropriate pedal and/or suitably miked-up amp; or to duplicate and then process the DI signal with software during the mixing stage.

The first option has the advantage of retaining the feel, dynamics and nonlinearities

of an amp, moving speaker coil and microphone, while the second option has the benefit of adjustable parameters at source.

This method gives you absolute control over the driven bass

element - you can manipulate it without having any impact on the other bass sources, which should contain all the depth and note clarity. This is an important aspect, as distorted bass tones will sound particularly muddy in the

sub-200Hz frequencies and, without proper control of the high-end, can sound extremely abrasive. Whether you're using hardware or software to achieve a completely separate track of bass distortion, you can afford to be fairly aggressive with the amount of drive, as this channel won't be used for the main body of the sound and most of the unwanted artifacts from the distortion will be minimised through corrective EQ. This EQ will have a significant bearing on the way the bass sits in the mix and blends with the other instruments.

The walkthrough below looks at EQing a distorted bass component to provide not only a punchy and aggressive mid-range with plenty of harmonics above the fundamental, but also rich high-frequency harmonics to help the bass cut through the mix. These high-frequency harmonics also encourage the psychoacoustic impression that the instrument is louder than it would seem without distortion.

## Distort to win

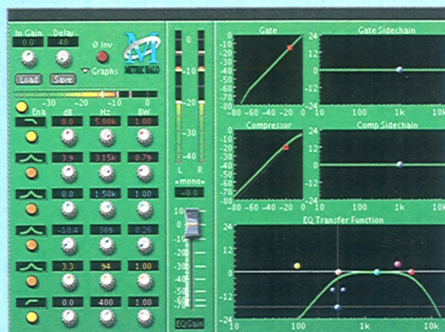
By using a channel of distortion in addition to the DI, microphone and software emulation components, you have four differing bass layers available to you at the mix stage.

When balancing these sources, focus on the DI, mic and emulation layers first, ensuring that you produce a bass tone that's tight in the low end and provides clear overall note definition before introducing the distorted bass channel. After you've introduced the rest of the track's instruments to the mix, experiment with pushing up the level of the distorted channel and assessing the impact it has on the mix. You'll need to spend time playing around with the settings of the high- and low-pass filters in order to gain the impact you require.

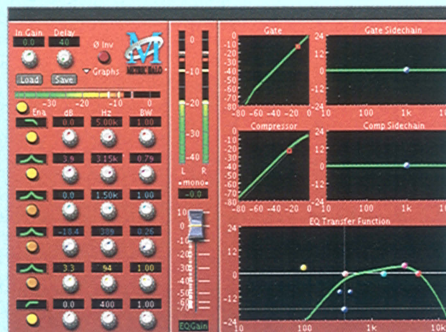
With the right balance, processing and manipulation of parameters, the ingredients from these four different sounds should combine to create a killer overall bass tone.

"The use of distorted bass on album productions can be traced from the 60s to modern day dance"

## > Step by step EQ a distorted bass tone



**1** > Here we're using a high-pass filter to remove the frequencies below 400Hz, which usually lack clarity and get muddy when a bass is distorted. The presence and note definition of a bass sound is normally in the 2-3.5kHz range, so the low-pass filter has been set to around 5kHz to remove any potentially abrasive high frequencies. If left alone, these could mask guitars, cymbals and so on.



**2** > Next, experiment with the frequency settings of the high- and low-pass filters, both of which will have a huge impact on the way in which the bass cuts through the other instruments. While you're doing that, have a go at amplifying different regions within the band-limited area, again in order to increase the harmonic content and enhance the presence of the bass.



**3** > Here's a more aggressive use of filters: band-limiting the distorted channel to the upper mids between 700Hz and 2kHz. This setting would be appropriate when attempting to get the bass to 'sit into' overdriven rhythm guitar, enabling you to give more overall level to the bass without it sounding overly loud. At a similar level without distortion, the bass would jump out of the mix and overpower the guitars.



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## Putting the bass in context

The next stage in getting the perfect bass tone is considering how to process your sound so that it locks and interacts with the kick drum – and the rest of the drums and instrumentation – as effectively as possible.

After making sure that all your separate bass sources are time-aligned and phase-coherent, group them all to a mono mixer channel. How this grouping affects your use of EQ and dynamic processing, and how that in turn impacts on the overall result, is another area misunderstood by the novice. The question of whether to use EQ and compression on the individual channels, just the bass group, or both the channels and the group is an important one, and it's worth developing your own processing preferences here. A good way of doing this is exporting bass sections with different approaches to EQ and compression implementation, then blind-testing them within the context of the rest of the mix.

If you apply different EQ curves to each of your individual bass channels, the sound will be considerably different to what you'd get if you just used a single EQ on the overall bass group. Unless there are significant unwanted resonant frequencies within the individual bass channels,

such as might well be the case with the distorted source, it will usually prove more effective to use EQ on the bass group alone. By doing so, you'll have overall control of the bass' frequency content, which usually proves more effective (not to mention easier!) than making adjustments at the channel stage, which may not have the desired effect on the composite sound.

If you do decide that you prefer manipulating the individual bass channels rather than the group EQ, then avoid boosting and cutting exactly the same frequency areas across them.

### Serial compression

When highly aggressive compression is required, it's often more effective to use two separate compressors in series – one on each channel and one strapped across the group – rather than just a single effect for all channels. For this technique to be effective, ensure that differing compression parameters are used on the channels and the group, otherwise this serial compression becomes redundant – you could simply double the ratio of a single instance of compression for the same effect, and that's certainly not what you're looking for.

### Multiband compression

At the mix stage we tend to use single-band compression, where the whole signal is processed identically. However, in order to achieve a full and consistent low end, many engineers opt for multiband compression.

The first thing that needs to be said here is that unless you know what you're doing, you shouldn't use multiband compression for a mix of any importance, as there's every chance that your settings will result

in a mix that doesn't translate well to other systems.

A multiband compressor divides the audio signal into two or more frequency bands (usually three or four), which are then compressed separately from each other, enabling you to set different threshold, ratio, attack and release settings for each.

For a three-band application of compression, start by setting the frequency crossover points at 120Hz

(to treat the lows and subs of the kick drum and bass) and 2kHz (above which the attack, note definition and presence elements reside).

We recommend that you adopt one of the two different approaches to compression for each band explained in the walkthrough below. Beyond that, if your kick or bass is lacking depth and weight in the low end, experiment with using an aggressive higher ratio for the low

band, but implement it with a relatively high threshold, so that only the peaks are reduced. Combine this with low ratios and thresholds in the mid and high bands, to provide gentle gain reduction there, and your mix should sound pretty darn great.

Alternatively, to enhance the clarity and 'air' in the kick or bass, play around with heavier, lower-threshold processing for sounds that fall in the band above 2kHz.

### > Step by step

#### Serial bass compression



**1** > We've set our channel compression to clamp down on the peak of the signal with a high **Threshold**, fast **Attack** and high **Ratio**. These settings should vary across the differing bass channels, the **Threshold** in particular. Don't be afraid to use higher compression ratios such as **8:1** and above. Due to the nature of distortion, it probably won't be necessary to compress the distortion channel.



**2** > The group compressor is set to compress the body of the signal with a low **Threshold**, slow **Attack** and medium **Ratio**. Spend some time experimenting with the channel compression set to compress the body of the signal. After that, work with the group compression to clamp down on any remaining peaks, so that you can establish which route is most appropriate for your bass tone and mix.



**3** > If your kick drum needs real prominence (in dance or hip-hop styles, for example), specific additional space can be created by bussing the kick drum to the sidechain input of the bass group compressor. Set the compressor up so that the bass 'ducks' slightly with every kick hit, thereby creating the space in the low-end required for the kick drum to have dominance.



> Step by step **Fit the bass around the kick drum**

- 1** > To effectively shape the frequencies of the bass, we need to remove its 'nonessential' content. This will stop the bass masking (see next page) or fighting other instruments for space. Experiment with a high-pass filter set between **50-85Hz**. The busier and denser the drums/bass, performance or instrumentation, the higher you'll likely need to set your high-pass filter.



- 2** > It can also be a good idea to remove the nonessential high-end frequencies of the bass, as they could potentially get in the way of the guitar, vocals and even cymbals. Experiment with rolling off the high end from anywhere as low as 3kHz up to around **6-7kHz**.

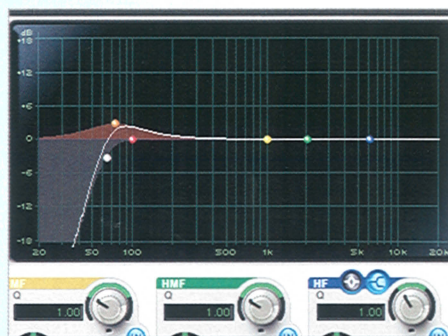
## POWER TIP

## &gt;The bigger picture

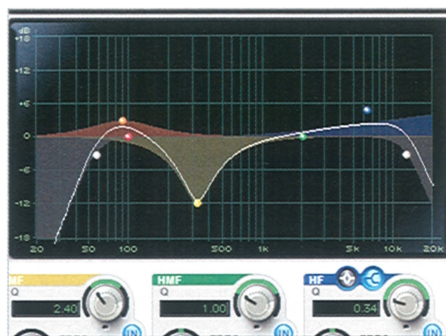
Since the context within which your bass is placed is an essential consideration in all of this, after making some initial corrective/creative EQ decisions, you should approach your final EQ with the bass playing alongside the rest of your instrumentation.

You may have heard that it's a good idea to route your kick drum and bass guitar to the same group and EQ them collectively. Forget it - it's a myth. Any boosts or cuts will result in poor separation or an unstable low end.

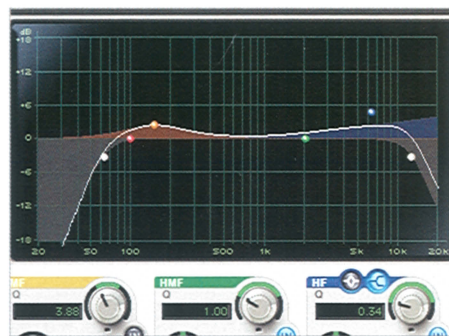
Don't amplify any bass or kick drum lower than 65Hz: this will result in an excess of mix-wrecking boominess. Most domestic speakers roll off below 70-75Hz anyway.



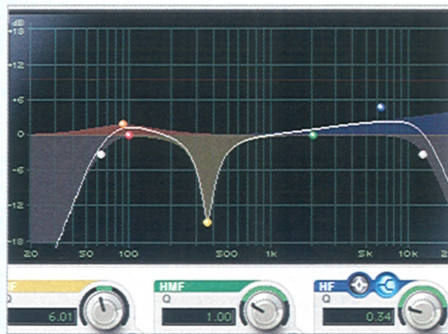
- 3** > Following the removal of nonessential bass frequencies, we can emphasise the fundamental low-end frequencies to provide the right depth to the mix. The fundamental low-end weight of kick drums and bass will usually be within 60-105Hz, a frequency range that tends to be felt rather than heard. Generally speaking, it's inadvisable to amplify a bass or kick drum frequency lower than 65Hz.



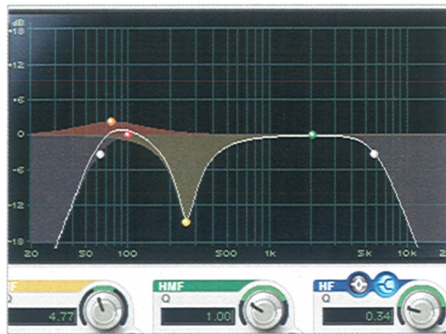
- 4** > When EQing bass, first consider the kick drum's frequency content and EQ curve. Don't boost the same frequencies in the bass and the kick, as this will result in an unnatural-sounding 'accumulation' in that range. Vary any low-end boost on the bass to that applied to the kick drum. This will achieve a more balanced tonal distribution, and thus a louder, fuller and punchier kick drum and bass combo.



- 5** > If you specifically want to boost the bass at a particular frequency, but the kick drum requires dominance of this range, a neat trick is boosting the bass frequency an octave higher. In other words, if your kick drum sits perfectly at 75Hz but you want to boost the same on the bass, try boosting at 150Hz in the bass instead. Doing so will have a similar psychoacoustic effect.



- 6** > Next, we need to process both the kick drum and bass to bring more clarity to both, while giving space to the other instruments. Examine the frequency content of your kick drum between 325-475Hz: this range often contains unwanted content that causes hi-fi speakers to 'pop'. Attenuate this with an appropriate **Q** width to create more kick definition and clarity as well as space for the bass to breathe.



- 7** > The low-mid 225-500Hz frequency range in the bass tends to sound very 'woofy', so you may need to attenuate that with a wide **Q**. This will provide more space for rhythm guitar or synth sounds to sit in. The frequencies attenuated in the kick and bass shouldn't be the same - experiment with these cuts to specifically assess the way they lock, interact with and reinforce each other.



- 8** > Finally, the attack, note definition and presence of the bass guitar can be emphasised by boosting around 2-3.5kHz. Experiment with widening the **Q** curve on a lower dB boost to avoid frequency accumulation, but ensure that you're not amplifying any high-frequency hiss or noise in the process.



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## Behind the mask

Masking is what happens when two or more instruments containing similar frequencies in certain areas battle for prominence. The result is that the weaker sound has its content obscured (masked) or made inaudible. This inevitably leads to a lack of separation and thus reduced definition and intelligibility in those instruments.

Avoiding masking is of fundamental importance when processing the bass and low-frequency content of your mix, since masking is more pronounced in low frequencies than high.

To avoid this happening, a specific frequency place needs to be found for each instrument, enabling them to breathe and sit together in the mix without fighting each other for sonic space.

### Avoiding accumulation

As you'd imagine, carving out sonic niches using your EQ tools requires some careful thought. When amplifying certain frequency ranges as outlined on the previous page,

watch out that you don't accidentally make any decisions that could result in unnatural-sounding accumulation. Due to the fact that this is more likely to occur at low frequencies, it's

important to be aware of techniques for avoiding this. Here are three tried and tested possibilities...

### Yin and Yang

When a certain frequency range is lacking in a particular instrument, we tend to automatically reach for the EQ and boost it. However, this can quickly lead to masking

and frequency accumulation, particularly if the process is repeated on other instruments, as their frequencies become obscured by the first boost.

To avoid this, attenuate the frequencies in other instruments that could be causing masking. For example, to give more clarity, note definition and presence to your bass, experiment with attenuating the same range on the guitars, strings, brass section, etc, rather than immediately boosting the 2-3.5kHz range.

The wider the Q, the lower the boost

Boosting a narrow range of frequencies can sound highly unnatural, particularly in the low-end, so simply widen the Q to enable a much lower, more natural-sounding dB boost.

### EQ Mirroring

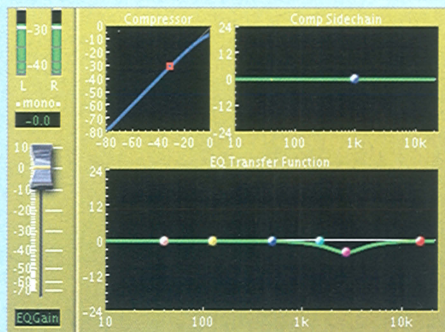
Rather than just making a frequency boost to a certain source, combine it with a cut to the instrument that could be masking it. By doing this, the impact of a far greater boost can be achieved with much less gain, thereby minimising the possibility of an accumulation of frequencies.

For example, if you want to amplify the kick drum at 95Hz, try mirroring it by attenuating the bass at 95Hz, thereby providing space for the boost. Similarly, if you found a frequency range with pleasing tonal characteristics in the bass sound at around 75Hz, you could combine amplification of this range with attenuation of the same on the kick drum.

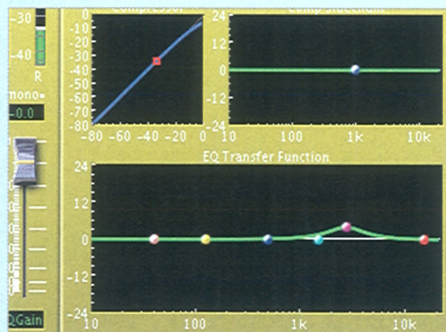
Mirroring your EQ boosts with cuts in this way will usually result in a louder and fuller production than you'll get by applying frequency boosts alone, and the lack of accumulation should ensure that it sounds as natural and unprocessed as possible.

"A specific frequency place needs to be found for each instrument, enabling them to sit together"

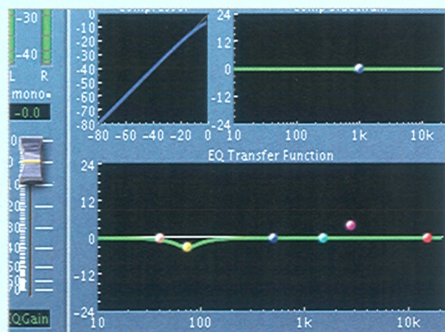
## > Step by step EQ mirroring



1 > Rather than automatically opting to simply boost the 2-3.5kHz range on the bass to enhance note definition, clarity and presence, cut the same frequency range on any instruments that could be masking it.



2 > In order to avoid frequency accumulation and achieve a more natural-sounding, louder and fuller mix, we opt for a 4dB boost to the bass rather than an 8dB boost.



3 > We combine this boost with a corresponding cut to the kick drum in the same frequency range - in this case, 73Hz - that uses the same width of Q. By adopting this EQ-mirroring technique, more boost can be achieved without loads of gain being applied, thereby avoiding frequency accumulation. **cm**



## **Item 7**

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# THE SOUND AND THE Fury

Take control of music's wildest tones with  
GUITAR WORLD's ultimate guide to recording modern metal.  
BY JEFF TENNYM ILLUSTRATION BY COJO "ART JUGGERNAUT"

**A**S THE COST OF DIGITAL audio workstations (DAWs) and recording equipment has come down over the years, it's become possible for musicians at all levels of income to produce their own songs. Unfortunately, this hasn't guaranteed that everyone's projects will meet with excellent results. Money still matters when it comes to hardware, software and the recording environment, as do the expertise and talent of the performers and producers.

For some music genres, low production standards may sometimes be perfectly acceptable. For example, some varieties of rock and folk are basic enough in instrumentation,

arrangement and rhythm to translate through even a raw recording, without impeding the listener's ability to gauge the quality of songwriting and performance.

But nothing could be further from the truth when it comes to modern, or extreme, metal. Badly produced metal will almost always result in a mush of sound, in which the quality of the material and performances is indeterminate. Much of the reason has to do with the music's particularly fast, complex and demanding drum parts and the challenges of reproducing them clearly. Double-kick drums are a prerequisite of the genre, as are the fast patterns and subdivisions that they employ. Then there's the dynamic complexity and speed of the snare performance,



Mastodon's  
Brann Dailor

including techniques such as blast beats. Finally, there are the challenges of recording the high energy and drive from the cymbal work without rendering the mix abrasive.

Modern metal rhythm guitar techniques, such as tremolo picking and fast triplets, pose similar problems, especially when guitars are downtuned, as they usually are. It's easy for the sound to lose note definition and clarity, and this problem increases when tracks are stacked. This is further complicated by the need for the riffs to lock together with the kick drums and bass (which is also often tuned down). As the cap to it all, the vocals must sit atop the instruments and not become buried under the mass of sounds.

The basic challenge of producing modern metal can be summed up in one question: How do you capture the high intensity of the performances, as well as the heaviness and weight of the sound, while emphasizing definition, intelligibility and clarity? Under the circumstances, it's no wonder that the novice engineer/mixer will often deliver far from optimum results.

In this article, the first of two parts, I'll explain how to deal with these issues in ways that can make your recordings sound more professional. In the follow-up, I'll tell you how to plan, record, engineer and mix a world-class quality modern metal production, even on a tight budget.

## BUDGETS AND THE IMPORTANCE OF DRUM TRACKING

**SIMPLY STATED, THE** vast majority of bad productions for this genre result from poor drum recording and processing. The drum kit's wide frequency range is part of the problem. The range of human hearing extends from 20Hz to 20kHz (though the range is narrower depending on age, hearing damage and so on). Unlike other instruments in a mix, the drum kit spans almost this entire range. Bass drum frequencies can extend to 40Hz, and splash cymbals will easily generate content in the upper frequencies near 20kHz.

And unlike electric and bass guitars and vocals, which typically emanate from a single source, a drum kit can easily contain upward of 10 pieces, including two kick drums,

one snare, four toms, hats, three rack toms and numerous cymbals. This makes achieving absolute individual control of the elements difficult, a subject I'll explore in next month's mixing article. For now, suffice to say that the drums will be a central focus of our study.

## RECORDING WITH A STUDIO BUDGET

**IF YOUR BUDGET ALLOWS** you to record in a professional studio, consider yourself lucky. But as we've just learned, modern metal requires that the instruments are well defined and intelligible in the mix. For this reason, avoid studios with live spaces that are very ambient, as the added reverberations will muddy the recording. Instead, use a studio that has extensive acoustic treatment, with a very short reverb time—around 0.3 seconds. This will provide the tightest, most controllable results, particularly with the drums. Many studios have a drum room for this very purposes, giving the engineer great control over the sound.

If your budget allows you to track only part of the recording in a studio, I highly suggest that you devote it to the drums, due to the complexities of recording the instrument. When checking out a studio's offerings, make sure it has a live room with sufficient acoustic treatment (see previous paragraph), a mic selection suitable for recording drums (covered later in this article) and high-quality mic preamps. Since you'll be tracking some if not all of the other instruments in another facility (possibly your own home), make sure that the drum tracks are provided to you in a format that you can access. They may be saved as complete session files that can be opened or converted in the format in which they were recorded (Pro Tools, Nuendo, Logic and so on), or they can be raw audio files (such as WAV and AIFF) that you can import into your recording platform. If the tracks are provided as raw files, they should be fully cataloged so that you know what song each belongs to. You may have multiple takes, as well as numerous drop-ins, and it's imperative that you know where each one belongs in its respective song arrangement.

Once you have your drum files in a workable fashion, you can begin overdubbing the other instruments. If your budget doesn't allow you to record these tracks in a professional studio, you should be able to achieve great results on your own using a DI (direct input) box and digital amp emulation plug-ins. A high-quality DI box (around \$250) will allow you to record all the guitar and bass performances directly to your DAW. You can then use amp, cab and effect plug-ins to get exactly the sound you want, or you can re-amp the tracks through your favorite rig using a device such as the Radial X AMP Active Reamping Device. Even if your budget allows studio time to track guitars and bass, you can record these parts on your own using a DI box and bring the raw tracks into a commercial studio. As with the drums, the essential benefits of a well-designed acoustic space, high-end mic preamps and microphones can go a long way to help you

capture the right guitar tone. And since the tracks will be prerecorded, your time in the studio can be spent getting the sounds you want rather than capturing a performance.

Just like the drums, vocal tracks can benefit tremendously from a commercial studio's offerings. The facility will have not only the best gear for vocals but also a sound-proof booth. In addition, an experienced engineer can be helpful in properly recording the wide dynamic range of vocalists and helping them with mic technique.

Once you have the instruments and vocals recorded, you should be able to do the majority of editing, processing and mixing at home. As the project approaches the final stages, you can transfer the session back to a commercial

ment is well suited to creating the tighter and more defined sound required by modern metal. First, avoid cube-shaped rooms—they display the worst acoustic properties due to the standing waves they create. A standing wave is a sound wave that remains in a constant position, and it can greatly exaggerate or de-emphasize frequencies associated with it. If possible, record in a fairly large room that is unusually shaped, with a high ceiling and walls that aren't parallel (parallel surfaces create standing waves). In particular, avoid ambient rooms and those with a lot of highly reflective surfaces, such as glass and tile. Set up the kit away from the walls as much as possible but without setting it up in the dead center of the room, as this is where soundwaves that bounce off the walls will converge and create standing waves. For that matter, microphones near the room's center will pick up sound reflections from the facing wall surfaces, and these reflections will meet the mics at slightly different times and cause phasing problems.



**“Recording to a click track worked great. Without it, I was always a bit too fast.”**

**—DAILOR**



studio to take advantage of the more accurate critical listening space and monitoring. In this instance, you'll have to ensure that the software platform used for mixing is the same as the studios and also ensure that all the plug-ins you've used during mixing are installed at the studio.

## RECORDING WITH A TIGHT—OR NO—BUDGET

**T HANKS TO MODERN** technology, it's possible to complete a project with little or no money, and with high production standards, provided you have a few key pieces of equipment and a recording space. However, in doing so you'll have to be more vigilant about the ambience of your recording space than you would in a professionally designed studio. Many producers who are new to the genre, or bands going down the self-produced route, record the drum tracks in any acoustic space where the kit and microphones can be set up, such as a rehearsal room. In the process, they often fail to consider how the room's acoustics affect the drums' sound, and they take no measures to improve the quality of the space.

For example, a highly reverberant room can make the kit sound mushy, with drums and cymbals bleeding together and the bass drum overpowering the other pieces of the kit. Spot miking the drums—that is, placing the mics six to eight inches from the individual kit piece—can diminish the effect of ambience somewhat, but it won't eliminate room coloration. For that matter, the drum overhead mics, which are crucial to picking up the cymbals, will certainly be affected by the room's dynamics, as they are typically positioned 18 to 24 inches away from the cymbals.

The drum kit's metalwork—the hi-hats and crash and ride cymbals—is one of the most critical, but frequently overlooked, elements of metal production. In contrast to music genres where a considerable degree of ambience in the overheads is appropriate, metal productions require dry cymbals recorded with pinpoint accuracy. When drum tracks are recorded in a poor acoustic environment without taking steps to minimize ambience, room coloration will be apparent in not only the spot mics but also the cymbal mics. As a result, the cymbals will lack the attack and pinpoint accuracy required for the music's high-end energy and drive.

You can take a few simple steps to ensure your environ-

ment is well suited to creating the tighter and more defined sound required by modern metal. First, avoid cube-shaped rooms—they display the worst acoustic properties due to the standing waves they create. A standing wave is a sound wave that remains in a constant position, and it can greatly exaggerate or de-emphasize frequencies associated with it. If possible, record in a fairly large room that is unusually shaped, with a high ceiling and walls that aren't parallel (parallel surfaces create standing waves). In particular, avoid ambient rooms and those with a lot of highly reflective surfaces, such as glass and tile. Set up the kit away from the walls as much as possible but without setting it up in the dead center of the room, as this is where soundwaves that bounce off the walls will converge and create standing waves. For that matter, microphones near the room's center will pick up sound reflections from the facing wall surfaces, and these reflections will meet the mics at slightly different times and cause phasing problems.

Room coloration can also can soften rhythm guitar and bass tone, and reduce note clarity and definition. For those reasons, avoid setting up the cab next to a wall or in the dead center of the room, and suspend blankets around the front and back of the cab. If you have foam sofa cushions, you can use them to build a small wall in front of the cab, which will also help minimize room coloration.

Likewise, when recording vocals in this scenario, build a 360° vocal booth, again with blankets and duvets, and if possible enclose the rear of the microphone diaphragm in an arc with two suspended foam cushions.

## EQUIPMENT

**WHEN RECORDING EXTREME METAL**, or any type of music for that matter, the equipment used for tracking is the most essential element in the production chain. For this reason, it's crucial that you get the right sound from the drums, bass and guitar at the source before you record. Don't assume you can “fix it” in the mix, because some things, like the effect of room ambience and mic placement, cannot be altered once an instrument is recorded.

Certainly, some specific styles and makes of gear are better suited to modern metal than others, but there is no right choice when it comes to equipment. Every artist and producer will have his own opinion on the matter. Regardless of what equipment is used, certain issues are relevant and must be considered if you want your recording to sound its best.

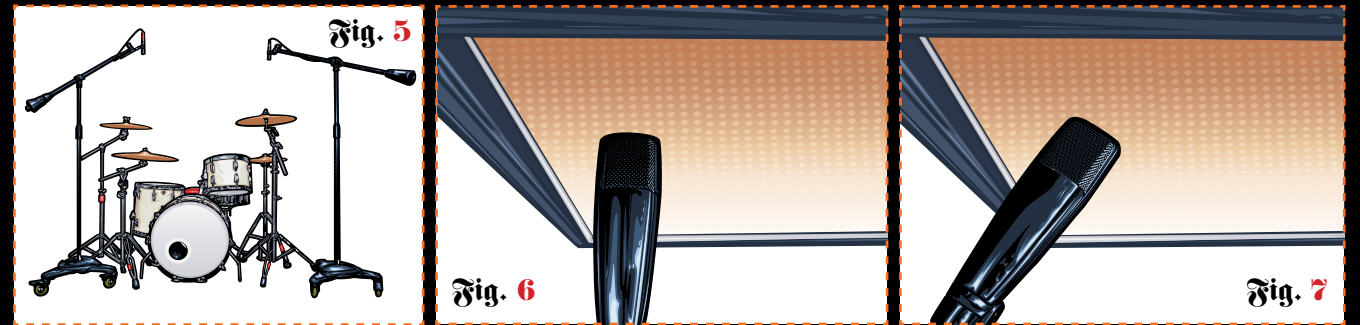
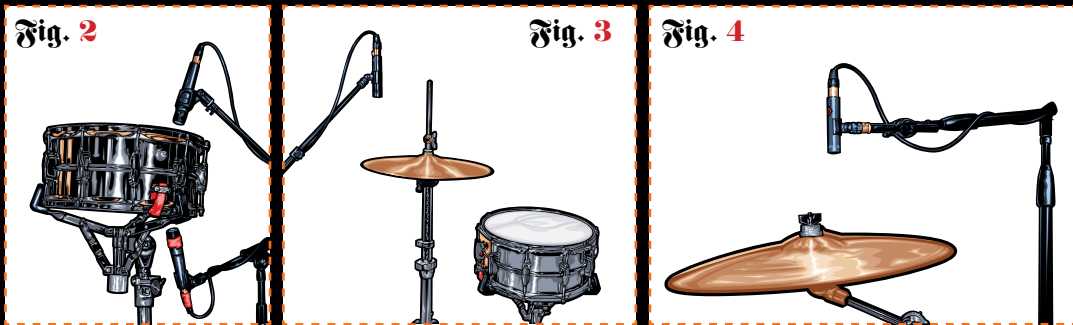
## DRUM HEADS: TUNING AND DAMPING

**OLD, PITTED DRUM SKINS** will greatly impede a drum's ability to resonate and project properly. New drum skins are the foundation of good drum tones. The skins should be stretched, tuned and, if necessary, dampened with a product made for this purpose, such as Moon-gel damper pads, rather than gaffer tape. A drum's resonator head, which is opposite from the batter head—the side you hit—needs to be changed from time to time as well. Even though resonator heads are never hit, they eventually dry out, which prevents them from flexing and vibrating correctly and causes inferior drum tone.

It is advisable to put new heads on the drums at least one day prior to the recording session and to use them for just one rehearsal to allow them to settle in properly. The kick-drum heads may not require replacement, since they tend to last much longer than the other heads. Ensure that a



## MIC PLACEMENT FOR DRUMS AND CABINETS (SEE TEXT FOR DETAILS)



slam-patch is used on the kick's batter head to increase attack, and keep both heads tuned very low, usually within just a single turn from being finger tight. This will enable the right "weight" and movement of air from the kick drum. Snare tunings vary depending on taste, but if the performance involves a lot of faster rolls, stick drags and ghost notes, the batter head should be very tight to enable the right stick response. If your snare drum tends to ring, try using a drumhead that is less resonant. I've used Evans snare heads and have had good results with the company's "dry" models.

For the toms, opt for smaller drum sizes, but again with relatively low tuning. However, avoid having the batter and resonator heads tuned to the same tension. While doing so will increase projection, it will result in a less-pleasing tone, without the pitch bend that is a desirable part of the modern metal tom sound.

## DOWNTUNING: STRING GAUGE AND INTONATION

**W**HILE MANY MODERN METAL guitarists and bassists use drop C and B tunings these days, I've encountered very few players who compensate for the lack of string tension by using higher-gauge strings. This is unfortunate. Tuning down a standard-gauge string can result in poor tone, because the string is much more slack than it was intended to be. For drop B tuning, I recommend guitarists use a minimum gauge of .056 for the 6th/lowest string; for basses, I suggest .130. If the entire instrument is tuned down, be sure to use heavier gauges for the entire set. Similarly, many musicians fail to have their instrument re-intonated for dropped tuning, which can cause tuning problems, particularly when rhythm guitar parts are stacked up.

In addition, it's essential that you place a fresh set on your instrument just before you start tracking and again after four or five hours of constant use. Bass strings tend to start going dead even before this, so you may want to change them more frequently.

## VOCAL SCHEDULING

**A**LTHOUGH OBVIOUSLY NOT equipment in the traditional sense, the vocalist's "instrument" is too often overlooked, and consideration must be given to the scheduling of vocal performances for extreme metal music. A vocalist can sing only a finite number of hours per day, and I know few who can do so for more than two hours. For this



reason, it seems pointless to leave a certain number of days to complete the vocals after the drums, bass and guitars have been tracked. Instead, schedule the vocals throughout the guitar and bass recording sessions, and designate a separate day for recording clean vocals, as aggressive vocal styles tend to affect a singer's range.

## MIC SELECTION, PLACEMENT AND THE TRACKING PROCESS

### Drums

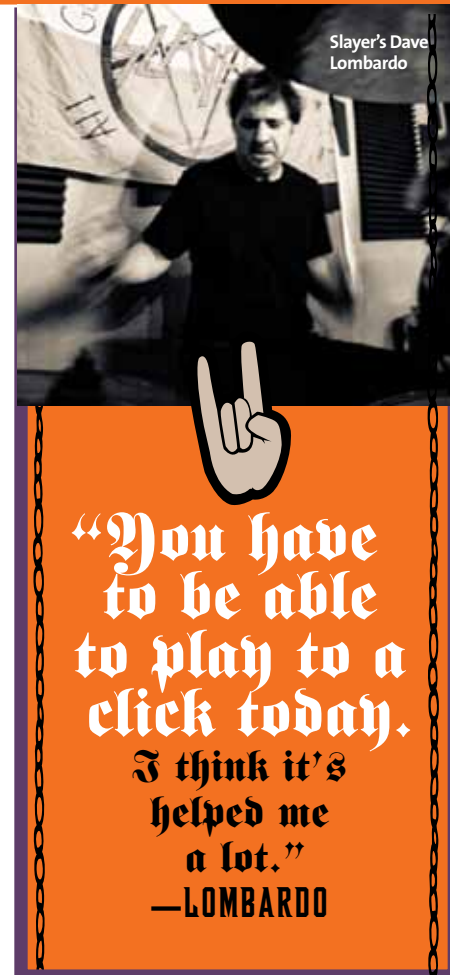
**COMMERCIAL STUDIOS HAVE** a wide range of microphones to work with, but if you're recording on your own, you may lack the variety and quantity of mics, cables and stands necessary to the task. If so, be prepared to spend some portion of your budget renting the necessary gear.

Regarding variety, you should use dynamic mics for the drums and condenser mics for the metalwork. Purchasing or renting the dynamic mics for the kit shouldn't be a large expense, as these tend to be cheaper workhorse microphones

that can be used for live work as well as studio applications.

For the kick drum, you should take care to mic the resonator head and the batter head. The resonator head gives the drum tone weight, while the resonator head provides attack. For the resonator head, use a wide-diaphragm dynamic, such as the Shure Beta 52, AKG D112 or Sennheiser RE20. Place the mic either in front of the kick resonator head (but away from the overly "boomy" center of the skin/drum) or half inside the resonator's sound hole, if it has one (**FIGURE 1**). At the same time, you can mic the kick drum internally with a standard-sized diaphragm dynamic, such as a Shure SM57 or Sennheiser 421. Focus the internal mic about four to six inches from the batter head, pointing its diaphragm (the mic's head, or capsule) just off the batter head's center. If access to the batter head is a problem due to the size of the resonator's sound hole and access for mic stands, consider using the Shure Beta 91, which has a flat profile and is well suited to this purpose.

For the snare, either standard Shure SM57s or Beta 57s should provide the right results. As with the bass drum, you'll want to mic the batter and resonator heads (**FIGURE 2**). For the batter, start with the mic about one inch above the head and an inch to an inch and a half away from the snare rim top, toward the drum's center. Aim the diaphragm toward the rim for more "crack" or toward the head's center for more stick noise. Moving the mic closer to the batter head will increase bass frequencies, due to the proximity effect, which causes a low-end boost when a source is close to a microphone. The resonator mic should be positioned directly beneath the batter mic to ensure consistent phase relationship between the two. Set the resonator mic three to four inches from the head, with the diaphragm aimed at the snare's wires, which should be positioned directly above the diaphragm. If you have only one mic available for the snare, place it horizontal to the drum's shell and point it at the side of the snare from five to six inches away. This will capture the top and bottom tones together. While it won't give you as much control as using two mics, the mic's greater distance from the heads will



inches away. You can minimize bleed from the snare by pointing the diaphragm toward the hats and away from the snare, or place the mic so that the hats are between it and the snare (**FIGURE 3**).

When miking the ride cymbal, maintain a distance of at least six to eight inches and point the diaphragm at the bell (**FIGURE 4**). If you have enough mic preamps to mic each cymbal individually or even in pairs, do so. If your drummer has a china cymbal, give it its own mic, and be sure to keep the overheads away from it. China cymbals are incredibly loud and have a tendency to bleed into other mics.

I must mention again how important the overhead mics are. Many producers put up and reference a spaced pair of overheads before any of the other mics, as they feel this gives them a representation of how the overall kit is interacting with the room, what tuning alterations need to be made and even what the most appropriate mic selections will be.

If you don't have enough preamps to mic the cymbals individually or in pairs,

help eliminate many of the unwanted frequencies that the top and bottom spot mics often contain. Whichever method you use, be sure that the mics are pointed away from the hats to help isolate the snare sound.

I have always found correctly positioned Sennheiser 421s excellent for miking toms. Make sure you position its filter switch to "M" (for Music) rather than "S" (for Speech); the "S" position rolls off the bottom end, which we don't want to eliminate. Mic the batter heads, using the suggestions given for the snare. If Sennheiser 421s aren't available, then the cheaper clip-on Sennheiser 604s also provide admirable results and eliminate the need for mic stands.

Getting the right condenser mics for the metalwork will be more costly, but the expense is well worth it. Dynamic mics lack high-end clarity and are far less natural sounding for overhead applications, as they require some creative EQing. I suggest AKG 414s, which will provide a detailed reproduction of the cymbals, hats or ride. If you have the money, opt for the superb Neumann KM 184 small-diaphragm pencil condenser mics or the more expensive wide-diaphragm Neumann U87s or U89s. To improve separation between the metalwork and drums, ask the drummer to raise the cymbals as high as he can without impeding his performance or comfort.

Some condenser mics will let you select the diaphragm's polar pattern—that is, how sensitive it is to the directionality of sound. A cardioid pattern is ideal, as it will minimize room effects and colorization. Other options, such as figure-of-eight and omni polar patterns, are undesirable, as they widen the mic's pickup pattern.

Concerning placement for the hat mic, don't mic too closely—it can make the hats sound clunky. Keep the mic at least six to eight

a pair of overhead mics will suffice. As mentioned before, keep the overheads 18 to 24 inches away from the cymbals, and aim the diaphragm at the rim of the cymbal (**FIGURE 5**). Place each of these the same distance from the snare to ensure a stereo image that doesn't pull to one side (many engineers use a piece of string to measure this). In addition, observe the 3:1 rule: the distance between the overhead mics should be roughly three times the distance from the cymbal nearest to the mics. For example, if the cymbal closest to one of the overhead mics is 20 inches away, then the distance between the two overhead mics should be roughly 60 inches. Observing the 3:1 rule will reduce phase problems from using two mics in close proximity, but it is an ideal, not an absolute. Pay attention to the distance, but let your ears be the judge.

Once you have everything set up and miked, record clean hits of every piece in the kit, including the cymbals. You can use these as individual samples during the mixing stage to replace any missing or poorly played hits. You can also use them to create your own drum sample library, which can be useful for other recording purposes, some of which I'll hit on below and in next month's article on mixing.

## Bass

**IT'S ASSUMED YOU WILL** record the bass both as a direct injection signal and with a microphone. The degree to which the bass is detuned will make a difference in what microphone you use. A smaller diaphragm dynamic mic like the Shure SM57 can provide a much tighter low end than a wide-diaphragm dynamic, such as the Sennheiser RE20 or AKG D-112, due to its sub-200Hz roll off. Still, if you have both types of mic, it's worth experimenting with each to see how it sounds. If the low end is still a bit boomy, back the mic away from the cab one inch at a time until the sound is tighter.

Consider splitting the bass DI signal to a secondary amp, amp/cab emulator or software modeler that's been set up to provide the all-important distortion element of the bass sound. A separate channel for the distorted tone will give you greater control over the sound. In addition, experiment with the DI signal using modeling software or hardware to create dirty-clean tones that can complement and strengthen your bass sounds.

If possible, track the guitars before you record the bass. You can usually achieve a much tighter performance by locking the guitars to the drums first. This will help you ensure that the bass is synced with both and that its frequency content is appropriate to the context.

## Guitar

**MIKING THE GUITAR IS** relatively easy. You don't need room mics or any microphone further than six inches from the

source, nor will you need to mic the rear of the cab. Dynamic mics are better suited than condensers to recording down-tuned guitars. Capturing the right rhythm sound is usually as simple as placing a Shure 57 or a Sennheiser 421 on the best-sounding speaker within a 4x12 cab. If you find that one of the bottom speakers sounds best, turn the cab on its side so that the speaker isn't close to the floor. This will help minimize the chance of unwanted ambience from floor reflections.

With regard to mic placement, the tone will be brightest at the dust cap (the speaker's center) and boomiest near the grille cloth. I suggest starting out with the mic just off the speaker's center and close to the grille cloth but not touching it. If the sound is too bright, move the mic toward the speaker's edge until you achieved the desired tone; if it's too boomy, or not tight enough, move the mic away from the speaker in half-inch increments until you achieve the desired amount of low-end definition and clarity.

You can also reduce brightness by placing the mic off axis. An on-axis mic is pointed 90° perpendicular to the grille cloth (**FIGURE 6**). Placing the mic from 45° to 85° off-axis relative to the grille cloth will reduce the brightness (**FIGURE 7**). I recommend trying an off-axis placement that is around 70° to the grille cloth but pointing in toward the speaker cone.

Additionally, many producers will use their favorite guitar mics in on- and off-axis configurations simultaneously to give them a broader range of rhythm tones. When doing so, the capsules of both mics should be placed as close to one another as possible to reduce phase problems when the two signals are combined.

I recommend tracking two rhythm guitars for each side of the stereo picture, unless there are extremely challenging guitar parts, in which case stick to one rhythm guitar per side to avoid creating a muddy sound. When recording two guitars per side, vary the tone between takes, either with the guitar, amp, cab or mic, as this will help produce a thicker tone.

## Vocals

**WHILE A CONDENSER MIC** is typically better suited to vocals than a dynamic mic, that doesn't mean it's the right choice for every vocalist. For that matter, you can't know which mic of either variety is best for your vocalist without some trial and error.

I suggest recording a quick test with your singer, using two or three vocal mics placed with their diaphragms as close together as possible. Record a vocal take using all the mics simultaneously, then listen to the results and determine which mic you prefer. It's essential that the singer stand the correct distance from the mics, as the proximity effect has a huge effect on the sound. Once this has been established, place a pop shield at least three inches from the mic, and

make sure that the vocalist remains at the same distance from the pop shield for the entire recording. Your singer can create a reference point by placing his hand perpendicularly between his mouth and the shield and noting the number of fingers he can fit within the space. Taking this step will ensure consistent volume and tone from one vocal take to another and over the selection of songs. (Note that you can achieve different tones for harmony and backup vocals by having the singer move to a different position relative to the mic.) If breath blasts are still a problem, experiment with placing the microphone slightly off axis (facing toward, but not directly in front of, the mouth area), so that the breath blasts go past the diaphragm rather than directly into it.

## CLICK TRACKS AND DRUM POST PRODUCTION

**ON MANY MODERN** metal productions, the drum tracks are often altered to improve the quality of the performance. Often, the tracks include elements that weren't performed at all but rather were added by the producer using samples. Most producers are loathe to discuss the post-recording work they perform on the drum tracks, and the drummers themselves are even less likely to own up to it, for obvious reasons.

For modern metal drum performance, accuracy is more important than vibe, feel or groove. The kick drum work and the beats, patterns, subdivisions and syncopation involved demand the highest standard of precision and accuracy. However, in many instances the drummer simply can't perform the parts with the accuracy required, leading producers to use various methods to edit, quantize (fit to the beat) or build patterns that make the drum track sound tighter. Doing so is one of the specific engineering challenges of the modern metal.

A click track is essential to this task. It provides an essential reference point that helps the drummer keep time and turn in the tightest performance possible. It also helps the producer after the fact by giving him a grid-like guide on which he can edit and quantize beats and build new patterns that make the drum performance sound more accurate.

Recording to a click track has become a staple of the modern metal method. Slayer's Dave Lombardo, one of the world's finest metal drummers, told *Modern Drummer* in its September 2006 issue that he recorded all his parts for the album *Christ Illusion* to a click track. He said, "There was one tune where we wanted to speed up the ending, so we turned the click off at that point. But that was it. You have to be able to play to a click today. I really like using one. It's helped me a lot."

Mastodon's Brann Dailor is another metal drummer who has changed over to playing with a click track. He told *Rhythm*

magazine in the April 2009 issue that he played to a click track for the first time when the group recorded its most recent album, *Crack the Skye*, at the urging of the album's producer, Brendan O'Brien.

"Brendan said, 'Look, let's just get it up and see how you get on, if it doesn't work, we'll lose it.' But it worked great... With a lot of our songs they'll start with a theme, then go somewhere else with a heavier feel, then return to the first theme again. And so I have to be careful that when we return to that part, it's the same tempo as we started...I was always a bit too fast [*without a click*] when we were recording. Then you have to think very hard about slowing yourself down, [*and*] then it feels too slow. It's a nightmare."

There are a few ways to create a click track. Your DAW will have a simple click-style metronome that can be turned on or off, and this signal can be sent to your drummer's headphones for reference. However, a heavier-sounding tone is often required, and some producers will simply build a click track on their own, then loop it for the duration of the song. For the main accents, such as the first beat of the bar, a piercing tone with plenty of body, such as a cowbell, will work fine. A guide guitar can be recorded on a separate track to give the drummer a reference point for the song.

Once you've worked with a click track, you'll begin to appreciate its benefits. To help you get started, here are five production tools and techniques that a click track facilitates, each of which you can use to improve recorded performances.

## 1. Playlists

**PLAYLISTS ARE A** particular function within the Pro Tools platform, but I'm using the term here as a generic reference to recording multiple takes within the same arrangement. A DAW lets you comp together multiple takes easily and quickly. The various takes can then be compared and the best parts selected and assembled into a composite performance. Recording each to a click track ensures that the various takes match up.

## 2. Edits

**EDITS ARE FIXES** within the track itself. If you want to fix a mistake in the second verse, it might be as simple as copying the same pattern from the first verse and pasting it in place of the bad pattern. Again, a click track is required for the timing of each part to be in sync. This technique can work to varying degrees of success with all instruments, as well as vocals.

## 3. Overall Quantization

**WHILE PLAYLISTS AND** edits allow you to utilize the best parts of the performances, quantization lets you tighten up the re-



cording by moving individual hits so that they fall exactly on the beat. The Elastic Time function within Pro Tools is a powerful and effective method of quantizing drums without causing glitches or artifacts (except in extreme cases; see below). Using time compression and expansion algorithms, Elastic Time lets you stretch waveforms in real time. To do so, however a tempo needs to be allocated as a reference. This is where a click track is beneficial. While it's possible to quantize performances that haven't been recorded to a click track, it's much easier to do so when they have, and the results will sound more natural.

## 4. Kick Quantization

**IDEALLY, ELASTIC TIME** should be applied to all the drum tracks collectively, to retain the phase relationship between these sources. However, it's not a cure-all, especially when it must be used to such an extreme that glitches and artifacts result. Excessive quantization can be unforgiving with hats and overheads, resulting in an unnatural sound. However, you may find that only the kick drum is in need of quantization. As it is the most challenging part of the extreme metal drum performance, the kick drum

is usually the one part in greatest need of help, and tightening its performance relative to the other instruments may make the overall track sound much better.

## 5. Kick Building

**SOME KICK DRUM** parts are so challenging that it's best to forego the drummer's footwork altogether and build a kick drum track entirely from samples. Again, a click track will make this task much easier. Grid lines within the DAW's edit window will show where the beats fall, making it easy to place and copy kick drums within the track, whether the kick pattern is based around 16ths, 32nds or triplets. Once a section is completed in this manner, it is a simple enough process to copy the bass drum patterns over to where the section is next repeated.

While it's not impossible to build a kick drum track when a click track hasn't been used, it is incredibly difficult and time consuming, as you'll have no grid on which to place the beats. Furthermore, once you've completed the kick drum part for one section, you won't be able to copy and paste it onto the next section, as the drummer's tempo will have undoubtedly drifted and the kick patterns will not line up properly.

However, the success of kick drum quantization and building depends on how well the edited track syncs up with the original kick drum signals that may still be apparent on the tracks recorded with the overhead mics. If the sync is noticeably off, you'll hear a "flam" as the edited and original signals are played back—a sort of blurring of the kick drum sound that will make the performance sound inaccurate, despite your best efforts.

Techniques can be employed during the tracking stage to minimize kick drum bleed. The drum can be covered with blankets to limit the amount of bleed onto the other mics. Another solution is to pack the kick drums with pillows and blankets and push them right up against the batter head, so that the only noise that the bass drum makes is the slap of the beater hitting the head. Both methods will minimize the sound level from the kick drum, making any bleed onto the overheads irrelevant. Finally, a bass drum trigger pad can be used, which will give the drummer the sensation of hitting a drum but produce no sound.

As an alternative, the drummer can be asked to simply stop playing on particular sections where the kick work will need to be built from scratch, thereby removing kick bleed completely. This technique works well, but it could be confusing for the drummer and may cause him to lose the groove and feel.

It takes skill and experience to build a kick pattern so that it's effective and perceived as authentic. Certainly, most producers would prefer to have the drum parts performed live and accurately. But much of the time, building a track in this fashion will be the best way to establish a strong production standard.

*Next month: how to mix modern metal.* **GW**

## **Item 8**

DISC INSIDE!

LESSONS: CHRIS BRODERICK ★ JEFF BECK

SLASH & MUCH MORE!

# GUITAR

**5 SONGS**  
WITH BASS LINES!

GUNS N' ROSES  
"PARADISE CITY"

YES  
"STARSHIP TROOPER"

JEFF BECK  
"PEOPLE GET READY"

MEGAETH  
"DIALECTIC CHAOS"

CREDENCE  
CLEARWATER REVIVAL  
"GREEN RIVER"

AVENGED  
SEVENFOLD  
EXCLUSIVE!  
M. SHADOWS  
REMEMBERS  
THE REV

THE GUITAR ICON GETS A LITTLE  
HELP FROM HIS SUPER FRIENDS!



# with SLASH

M. SHADOWS ★ OZZY ★ LEMMY ★ IZZY ★ IGGY ★ FERGIE & MORE!

IN DEEP WITH  
**JEFF BECK**  
INTERVIEW & LESSON

MEGAETH'S  
**CHRIS BRODERICK**  
SHOWS YOU HOW TO PLAY  
THE IMPOSSIBLE!



Future

# The Sound and the Fury

## PART 2

In the conclusion to our series, we tell you everything you need to know to mix your modern metal production.

By Jeff Tenym \* Illustration by Cojo "Art Juggernaut"

Mixing music is an art form. Like any of the arts, it requires a high level of training, intuition and creativity. Technical knowledge alone can help a mixing engineer understand how to fix a problematic mix, but it takes instinct to deal with unique situations and a sense of artistic style to give a mix a character that's appropriate to the music and performer.

In last month's article, I explained how to plan and record your modern metal music project. In this feature, I'll take you through the next step of the process, mixing the project, with a focus on the technical and creative aspects of the task. By reading this, you can avoid the numerous mistakes that novices make and learn procedures and common approaches to take when mixing modern metal.

### MONITORING

**THE QUALITY OF YOUR** monitors and listening environment has a direct correlation to the results you achieve when mixing music of any style. Cheap monitors and an acoustically untreated room will mask

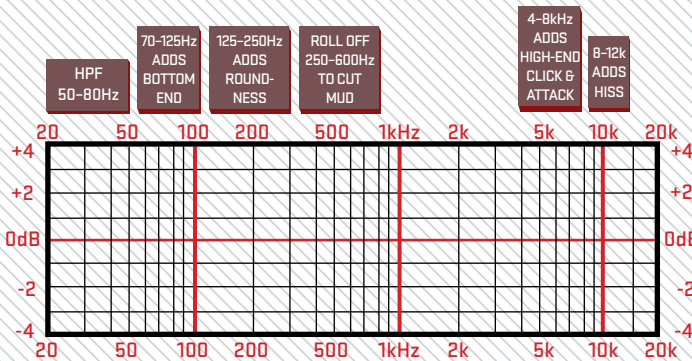
critical elements of the music and introduce problems of their own, making it impossible to determine what needs fixing. For example, monitors with poor low-frequency response will disguise the quality of bass tones present in your mix. Likewise, an untreated mixing environment can be prone to standing waves, which cancel out key frequencies, and highly reflective surfaces that blur the stereo picture and make accurate monitoring difficult. If you can't hear problems, you can't fix them; and if your equipment or room is poor, you may spend time trying to correct nonexistent problems. Either way, this will result in an inferior mix whose problems will become glaring when played back on another audio system.

Under the circumstances, it's worth spending money on the best monitors you can afford and taking time to properly treat your room. Research the monitors within your price range, and read as many reviews as you can. Also, be sure to purchase monitors from a store that will allow you to return them, in case you find they aren't right for you. Remember, too, that monitors are not supposed to sound good—they're designed to let you hear your recordings accurately. This is why you shouldn't mix on hi-fi speakers, which are "hyped" to emphasize ear-pleasing frequencies.



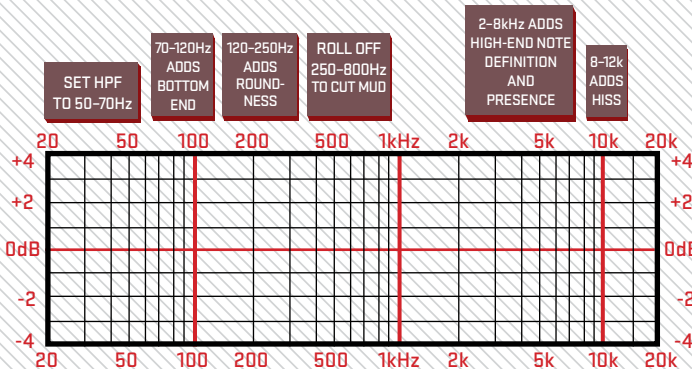
## KICK DRUM: CRITICAL FREQUENCIES

Be careful with the sub-70Hz frequencies, particularly on faster performances. Muddiness can usually be rolled off around 330Hz. Boost around 4-8kHz for the high-end "click" and beater attack usually associated with metal bass drums. [See page 82 for more information.]



## BASS GUITAR: CRITICAL FREQUENCIES

Try boosting around 70-120Hz to add body. Muddiness can be rolled off around 330Hz. If more presence, clarity and brightness are required, look at boosting from 2kHz upward. [See page 82 for more information.]



Room treatment consists in large part of following the room-damping techniques described in last month's feature under the section on miking technique. The key job is to minimize or eliminate reflections, but there are other issues as well, such as diffusion (to scatter reflections) and bass traps for room corners, where bass frequencies gather and exaggerate the low-end content. The topic is beyond the scope of this feature, but with a little online research and a modest budget, you can make most rooms suitable for mixing.

If your budget allows you to mix in a professional studio, by all means do so. If you can't afford to, you might find you have the funds to listen to your final mixes in a pro studio, where some over-all sweetening can be applied to make your work sound more professional.

## HEADPHONES

**NOVICE MIXERS OFTEN** think they can achieve a quality mix with headphones. Certainly, headphones should be used within the process, as they allow you to hear more details, including low-volume signal noises you might otherwise miss when listening on speakers. But you shouldn't use headphones as your primary monitoring source, as doing so will more than likely produce a mix that's unstable in the low end—you'll either hear the low-end so well in the headphones that you'll push it down in the mix, or the mix won't sound full enough and you'll push the low-end content up. Either way, the results will suffer.

Headphones also exaggerate the stereo picture by separating the left and right sides to an extreme degree. When

listening on speakers, each ear hears not only the sound from the speaker closest to it but also a bit of the sound from the other speaker. Headphones also give a mix an unusual spatial feel, since they place the sounds at either side of the listener, eliminating the front-to-back information you get when listening on speakers.

## MIX LEVELS

**WHEN RECORDING MODERN** or extreme metal, it can be tempting to mix at high decibel levels. However, you can better assess the instrument balance, frequency spectrum and content of a mix by doing your primary mixing at a conversational level—one at which you and your bandmates can talk at normal volume and hear one another. Once you think you have a good sound, turn up the volume to whatever level you like or require, and check your results. Likewise, if you need to hear something in greater detail when mixing, turn up the volume so you can hone in on the track, or listen in with your headphones, but return the volume to a lower level when you've finished. In addition, be sure to check your mix on different systems, in different environments and at different listening positions within them. Doing so will ensure that your mix translates well to other systems and rooms.

**"It's helpful to visualize the production as existing in three dimensions: width, height and depth."**

## CONCEPTS

**LAST MONTH'S ARTICLE** on recording modern metal gave considerable space to tracking the drums, and the same will be true for the mixing stage. The reasons for this are largely the same. As noted last month, the range of human hearing can extend from 20Hz to 20kHz, and the frequency content of a drum kit spans almost this entire range. A bass drum will tend to have frequencies right down to 40Hz, a small splash cymbal will usually have content right up to 20kHz, and other drums and metalwork will fall within these two extremes. Therefore, one of the main challenges of mixing is to manipulate the drums so that they appropriately and effectively sit within this range.

## REINFORCEMENT, PRECISION AND CONTROL

**BEFORE DIVING INTO THE** creative side of mixing, it's important that you perform any tasks necessary to make your tracks ready. This will allow you to stay in your "creative zone" during the mixing stage. The tasks we will look at are re-amping, time alignment, phase correction, gating and waveform editing, and grouping.

### Re-amping

**RE-AMPING IS A** process in which a guitar or bass is recorded by direct injection (D.I.) to the recording con-

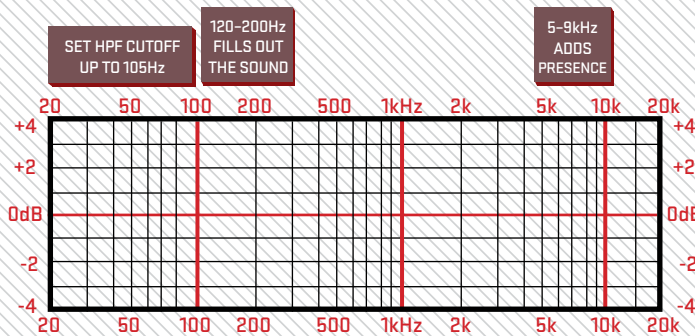
sole, a process that converts the high-impedance signal to low impedance. The instrument is typically recorded without any effects or tone coloration. Once the signal is recorded, it can be routed back out and into a guitar rig and treated to any tone coloration desired. The amp can then be miked and recorded. In essence, re-amping gives you the option of altering an instrument's sound to suit a mix. This is a good approach if you aren't sure how you want the guitar or bass to sound at the time that they are recorded, or if the rig, mic or studio you want isn't available at the time that you record the instrument. Re-amping is highly significant to the metal genre due to the very specific tone, note definition, weight and clarity required for the genre's bass and guitar tones. With this in mind, engineers should always track guitars and bass in this fashion.

### Time Alignment

**ONCE A TRACK** has been re-amped, it must be time aligned if it is going to be used in conjunction with the original recorded signal. Time alignment refers to the time delay between when the original signal leaves the soundcard and is recorded back. Remember, the signal has to travel through the guitar rig, be picked up by the recording microphone and returned to the DAW. The delay is minimal—it's usually represented in milliseconds or samples—but it is significant enough to introduce comb filtering, which results in the "thinning out" of frequencies. Comb filtering occurs when a signal is combined with its duplicate and the duplicate is slightly delayed. This results in reduced frequency response of the fundamental tone and its odd harmonics. Note that time align-

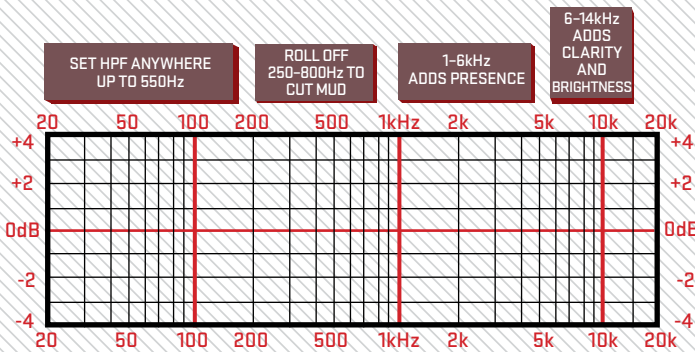
## SNARE DRUM: CRITICAL FREQUENCIES

Try a boost around 120-250Hz if the snare is too thin. Boost near 6kHz to add crack and attack to the snare. Use a shelving filter rather than a peak filter when appropriate. [See page 82 for more information.]



## METALWORK: CRITICAL FREQUENCIES

Use a high-pass filter to roll off frequencies from around 400Hz to 550Hz upward. Boosting frequencies around 6-14kHz can add clarity and brightness. [See page 84 for more information.]



ment isn't a significant issue if you don't plan to use the reamped track together with the original signal, since comb filtering won't occur and the slight delay in the re-amped signal won't be noticeable to the listener.

Time aligning involves lining up the delayed track with the original track to ensure both tracks begin at precisely the same time. Let's imagine we want to do this with a bass guitar track that we have just recorded after re-amping it through a bass rig. To do so, zoom in on the waveform of the bass amp signal and look for a significant transient. (A transient is the short duration initial attack phase of an audio signal. When displayed as a waveform, it can be seen as the initial peak.) Now find this same transient in the D.I. signal. You'll notice the transient of the amp's waveform occurs slightly after the D.I. signal. To align it, simply click on the bass amp waveform and drag it until the transients of the two waveforms are aligned. To make this job easier I will often place a cowbell at the start of the D.I. track before the performance begins and then use its transient as a guide with which to line up the tracks.

Time alignment can also be used with the various drum tracks you've recorded to correct time differences that result from the varying distance between the mics and their sources. For example, the overhead mics may be three feet from the snare, while the snare spot mic is just inches from the drum. By comparing the transients on these tracks you'll see that they are not aligned. To correct this, you would align the transients on the overhead mic tracks with those of the spot mic track. Bear in mind that producers have different opinions about the benefits of doing this, but you should try it to see the results and determine for yourself the value of time aligning the drum tracks. I have had great success achieving a thicker, weightier snare tone by time-aligning the overhead tracks by as little as a few milliseconds. However, be aware that you can't time align the whole drum kit due to the various distances between its composite parts. Instead, focus on a main piece of the kit, such as the snare or bass drum.

### Phase Correction

**ONE OF THE MOST** common problems of a multi-miked kit is phase cancellation, which can make drums sound thin and leave them unable to punch through bass tracks and dense layers of rhythm guitars. Phase correction can solve the problem, but many novice mixers won't even be aware that phase cancellation has occurred. Instead, they will attempt to fix the problem through extensive equalization, which is inappropriate to solving the problem. When I've encountered this problem on the projects of beginning engineers, usually all that was necessary was to reverse the polarity of a certain source, thereby making the drums sound vastly improved. Most DAWs have a utility plug-in that allows you to do this.

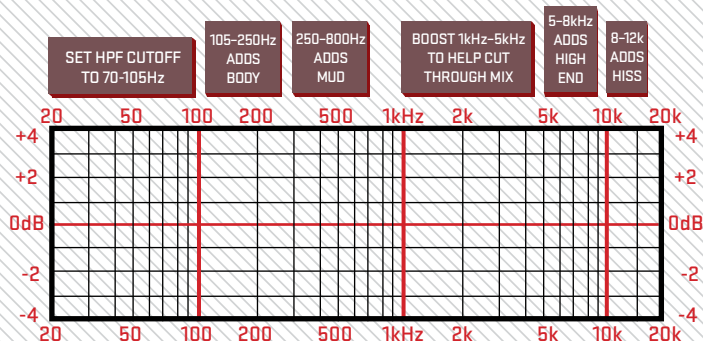
As recommended in last month's article, if you have double-miked your kick drum (or drums), ensure that these are phase reinforcing by fading one in with the other, first without polarity inverted and then again with. The setting that provides the greater level of low-frequency content and volume is the correct one to use, as it will produce phase summation. If you are using a kick drum sample (see below for a full discussion of samples) then repeat this exercise with the polarity of the sample, this time auditioned against both of the spot mics on the kick drum.

In the event that you did not flip the phase of the mic on the snare bottom while tracking, do so at the mix stage. Even if you did, check it with the audio track for the snare's top to ensure the signals are in phase.

Finally, check all the drum mics against the overheads, and after confirming that all the individual bass

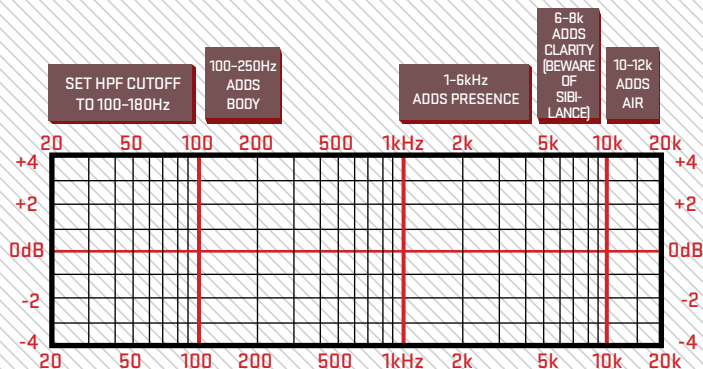
## RHYTHM GUITAR: CRITICAL FREQUENCIES

Use a high-pass filter below 70-105Hz, depending on the degree of drop tuning. Pay attention to the 1-3kHz region, where a lack of mids can be compensated for, but where there are often also resonant mids that will need attenuating. Boost from 5-6kHz upward for presence. [See page 84 for more information.]



## VOCALS: CRITICAL FREQUENCIES

Equalizing vocals can be a big challenge, as frequency content and tonality varies greatly with the voice and microphone used. A boost around 6-8kHz can add some clarity; a boost at 10-12kHz adds "air." [See page 84 for more information.]



sources are collectively phase summed, ensure that the bass and kick drum are correctly reinforcing one another.

### Gating and Waveform Edits

**GATING AND WAVEFORM** edits are performed to "clean up" the sounds on the individual tracks. Gating is used to block out unwanted sounds (i.e. bleed-over from nearby sound sources, fingers on guitar strings and stray ambient noises), while waveform edits such as fades are used to create smooth decay tails on instruments that have some amount of sustain, such as toms.

These tasks are important to modern metal production, particularly the drums. For some genres, bleed-over from the drums onto the various mic sources can be conducive to the overall sound, but this is not the case for modern metal drum tones. Here, due to the

very specific weight, clarity and definition required by the genre, you'll need to use extensive levels of EQ on the drums. Unfortunately, those EQ levels will affect everything on the track to which the EQ is applied. So if you have kick drum leakage on the snare track, you can expect the snare's EQ to affect the sound of the kick, and probably not in a pleasant way.

For this reason, and to reduce the possibility of issues with phase cancellation, it is usually essential that the drums within the kit are extensively and heavily gated and/or edited. (The metalwork will be dealt with using filters, a topic that is addressed below.) For the kick and snare, it is appropriate to use gates, but for the tom tracks it will usually be faster and more accurate to carry out waveform edits, whereby anything other than the tom hits and their decay on

each relevant track is removed. Using a very brief fade in and long fade out will create a natural sound and retain the tail of the tom's sustain.

Similarly, take this opportunity to "top and tail"—that is, remove unwanted noise before and after the performance—the tracks containing the hi-hats, overheads and ride cymbals. Do the same with the guitar and bass tracks, as these will likely have amp noise on them. In addition, spend time cleaning up incidental string noises, again using very brief fades. There may be some guitar performances where gating would be appropriate to the task, but consider this on a track-by-track basis. For that matter, your gate plug-in should allow you to dial in the rate at which the gate closes, which will give you another degree of control. Finally, if an instrument is silent for any significant amount of time, be sure it's faded out, or that its track is disabled, during the time that the instrument is not in use.

### Drum Samples

**ONE OF THE MORE** unique aspects of modern metal production is the extensive use of drum samples, typically for the kick and snare, though occasionally for the toms as well. Modern metal demands consistent dynamics and power, and samples are perfectly suited to the task, since they provide the engineer with a high degree of control. As suggested last month, if you took clean hits from the drum kit used for tracking, you can create a variety of samples from these by varying the balance of the numerous spot and overhead mics. This is the time to experiment with the samples, by determining how they interact with and reinforce the performance mics. Make sure that the sample not only provides the right weight and attack but also sounds natural in the spot mic and overhead positions.

Unless a performance requires a complete fix, most producers for the genre, myself included, prefer to use drum samples to reinforce, rather than as replacements for, the original performance, as this method retains more of the performance dynamics and provides a more natural tone. In the event that you need to completely replace the kick and snare spot mics, it's probably because the tone captured is unsuitable, in which case your drum samples will be of no help, since they were recorded using the same kit and set up. In that case, consider checking out commercially available drum samples.

When using drum samples for reinforcement, it's essential that they are precisely lined up with the original hits and are phase reinforcing. Also, take care that the dynamics of the snare samples don't exceed those of the snare on the performance mics, or they will tend to sound programmed (often referred to as "machine gunning"). This is especially important on snare/buzz rolls and ghost notes. You can use automation on the samples to approximate the dynamics of the original snare track.

### Side-Chain Gating

**ONCE YOU HAVE** lined up your kick and snare samples, you can copy them to a new track where they can be used to open your gates via sidechain for the acoustic performance kick and snare mics. Clearly, if you have implemented these samples correctly, these will only ever be on the kick and snare hit points, where the gate will need to open.

Automatic gates can sometimes be slow to open, thereby causing truncation of the essential transient attack of the drum hits. To ensure that the gates open on time, copy the drum samples to new tracks and move them 10 milliseconds earlier in the performance, then use the tracks to open the gates for each relevant piece of the kit. The 10ms gap should be sufficient to ensure



the gate opens in time for the transient to pass through. Note that these new tracks will be used only to open the gates and not to provide audio to your master output. The output of the channels with these tracks should be assigned “no output”; a send bus should be used to direct the track to the sidechain of the relevant gate.

## Groups

**YOUR SESSION SHOULD** now be edited, gated and phase summated. At this point, it's worth taking time to set up mix groups. For example, you can take all of the audio tracks related to the drum kit and route them to a single stereo channel on the mixer. This will make it easy to raise and lower the volume of the entire kit and apply compression, equalization, effects and so on across the kit. At the same time, you'll still be able to adjust the volume for each part of the kit and insert compressors and effects on each of the tracks within the group. It may also be useful to create subgroups within the group, such as one for the bass drum mics, another for the snare drum mics, and so on.

Bear in mind that applying EQ to the group will produce a very different result than if you applied it to individual channels within the group. I have my own preferences that I have developed over the years for each instrument, but this is something that I feel that every mixer should experiment with by exporting sections with different applications of processing and comparing them.

## CREATING THE MIX

### Panning

**WHEN MIXING METAL**, I always like to visualize the production as existing in three dimensions: width, height and depth. Width represents the panning and instrument placement across the stereo field; height is the frequency content, from the sub bass to the highs; and depth is the sense of space created in the mix using reverb, delays and so on.

When panning, start by auditioning just the overheads and set the stereo width to appear natural. Avoid the temptation to pan the overheads and toms as wide as possible, as this will usually give excessive movement and an unnatural stereo width to the drums. Instead, pan the toms to reflect where they appear on the kit. Some producers prefer to pan the kit from the audience's perspective, while others like to do it from the drummer's. It's your call.

The rhythm guitars should dominate the far extremities of the stereo field. However, if you have stacked up four rhythm guitar tracks, experiment by panning one of the two pairs very slightly in toward center, and analyze how each interacts with the width of the drums.

## EQ

**ARGUABLY, THE GREATEST** single challenge that mixing presents is the perception, understanding and manipulation of frequencies, and this is usually where the novice mixer will make the greatest number of mistakes. Every single decision you make when mixing is the result of what your ears are telling you and how the audio is perceived. Given the highly specific qualities of modern metal production, it may take years of critical evaluation and experience to develop accurate perception and appropriate manipulation of frequencies.

This is another critical area where I can recommend a level of investment. Unfortunately, many of the stock EQ plug-ins that come with software DAW platforms lack the quality and accuracy necessary for corrective equalization. In particular, they often don't provide a tight enough Q, or resonance, setting. Q is the band-

width of a filter, and its value is adjustable on many equalization plug-ins. Narrower bandwidth, represented by a higher Q value, yields greater precision over the frequencies that are affected. Note that both narrow and wide Qs have their uses—one is not better than the other, though narrower Q values let you hone in on frequencies and adjust them with minimal impact on neighboring frequencies. If you're interested in high-quality EQ plug-ins, check out offerings from Waves, IK Multimedia and others.

## Low-End Depth and Definition

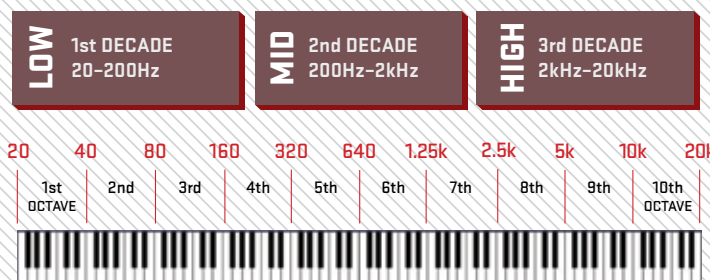
**ACHIEVING A STRONG** balance between the frequency ranges is essential to any production, no matter what style of music. However, the intensity, density and downtuned nature of the tones and performances in modern metal make it difficult to get a heavy, yet tight, low end that

retains note definition and clarity. It also makes it hard to achieve a clean high end that has the necessary attack and energy and doesn't sound brittle and abrasive.

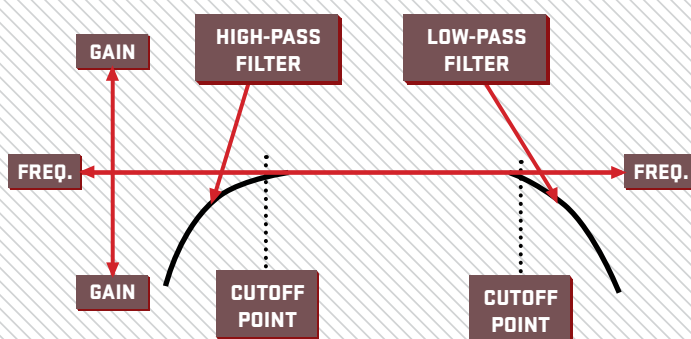
Novice mixers make the mistake of dialing in bass frequencies to make their mix sound heavy. This tends to create a muddy, flabby low end and poor overall intelligibility. Instead, they should remove or minimize the nonessential low-end frequencies so that few instruments are fighting for space in the low-frequency region. When instruments vie for frequency space, the result is frequency masking (also called simply “masking”). The more dominant instrument will obscure the quieter or weaker sound.

Masking can be avoided by cutting the frequencies that are causing the problem, rather than by boosting the frequencies on the track that is being unduly affected. For example, if a vocal sound is having trouble cutting through

## EQUALIZATION AND THE THREE FREQUENCY DECADES



## HIGH- AND LOW-PASS CURVES



The audible frequency spectrum can be divided into three “decades” (top diagram) representing the low-, mid- and high-frequency ranges. This provides a convenient and useful way to regard the frequency balance of your mix. High-pass and low-pass filters (bottom diagram) can be used to filter the bottom and top ends of the frequency spectrum to reduce low-end clutter and high-end sibilance, respectively. This graph illustrates how the filters reduce the volume (gain) of frequencies below the HPF's cutoff point and above the LPF's cutoff point. (See page 80 for more information.)



layers of downtuned, tracked up rhythm guitars, you might think you should boost the key frequencies of the vocals. Instead, try cutting the frequencies on the guitar that are masking the vocals. This will usually result in a much more natural-sounding production, as the extreme EQ boosts that are required to make vocals cut through will make them sound artificial.

## High-Pass Filters

**HIGH-PASS FILTERS** (HPFs) are a great way to help clear up the low-end spectrum. An HPF cuts frequencies below a set cut-off value and passes frequencies above that value. I can't stress enough the importance of HPFs to achieving a clear, well defined low end. I will frequently use HPFs on every instrument. The more dense, intense and heavily layered the production, the higher I'll set the frequency below which to filter.

Generally speaking, I recommend removing frequencies below 50Hz right across the mix (with perhaps the exception of sub-bass samples). Set the cutoff frequency for each HPF to the lowest useable frequency of each instrument. With bass drums, the speed of the kick pattern will affect how high you set the cutoff. Faster performances would require higher cutoffs, since the low frequencies of each kick would otherwise build up and resonate excessively. An appropriate setting would be in the region of 50 to 80Hz, and possibly even higher with particularly fast kick drums.

A large floor tom would be treated in a manner similar to the kick. Smaller toms require higher cutoff frequencies, up to about 180 to 220Hz for a small eight- or 10-inch tom. For the snare top, I would typically set the HPF between 125 and 170Hz, depending on the source, but slightly higher for the snare bottom.

It's usually easy to set the cutoff on the HPF for the kit's metalwork. Start at 50Hz and, with your ears focused on the high-frequency content of the cymbals, sweep the cutoff upward until these high frequencies are significantly affected, and then back off the filter slightly. As a reference, this will usually be between 400 and 550Hz.

The bass guitar, like the bass drum, will usually require a HPF in the 50-to-70Hz range, though this will be affected likewise by the speed of the performance.

The nonessential rhythm guitar frequencies will be heavily impacted by the degree of downtuning involved. The lower the tuning, the more likely it would be that your HPF setting is set to a lower frequency, usually anywhere between 70 and 105Hz. In any event, the filter used should prevent the rhythm guitars from fighting the kick and bass guitar for sonic space, and provide the guitars with better clarity and note definition.

Depending on the style of vocalist and the register used, there is very rarely any

useable frequency content below 100Hz, but it is usual that a HPF would be set higher, anywhere up to 160 or 180Hz.

## Low-Pass Filters

**TO A LESSER EXTENT**, low pass filters (LPFs) can also be used to mark the highest useable frequency range of an instrument, or alternatively to minimize high-end hiss. Clearly, this can also help minimize masking of instruments with a lot of high-frequency content, such as hats/ride and overheads.

## Creative EQ vs. Corrective EQ

**ONCE YOU HAVE REMOVED**, or minimized as much as possible, the undesirable/nonessential frequencies from the low and high ends of the spectrum, areas within the remaining critical range can be emphasized (creative EQ) or attenuated (corrective EQ). Most novices tend toward creative EQ, emphasizing rather than attenuating frequencies. I caution against this. Boosting frequencies often seems to make them sound better because our brains tell us louder is better. But too much boosting can result in frequency masking, as explained previously, and create fatiguing mixes. It also makes instruments sound unnatural. Obviously there are times for this, but I suggest you focus mostly on corrective EQ.

When mixing metal, you will usually be presented with signals that exhibit resonances. These resonances are high levels of energy at a particular point in the frequency spectrum. Often they are not needed and will cause a mix to lack clarity and definition. They also tend to mask other frequencies and are generally not pleasing to the ear. A well-trained ear will be able to hear, pinpoint and pull out these frequencies without much problem.

However, until you develop your frequency recognition skills, the "sweep Q" technique can be used to locate resonances. Place an EQ plug-in on your channel, set it for a peak filter with a tight Q curve, and boost it about 8 to 10dB. The resulting curve should be flat across, except for a tall and narrow peak. Sweep the frequency selector to move the peak across the spectrum. When you reach the signal's resonant frequency, you'll know it, as it will be quite loud and ringing. (Be sure your monitors are not turned up high or you may damage them, as well as your ears.) Once you've located the frequency, dial down the gain on the EQ until the curve is flat. Continue dialing down the gain below 0dB until the resonance is less harsh or obvious. Don't dial it down too much or you may lose the essential character of the sound. For that matter, be sure to listen to the resulting sound in the context of the entire mix (see page 82).

Remember that, because our ears have a tendency to find the amplification of frequencies more appealing than

attenuation, it may take longer for you to hear and appreciate the benefits of these changes.

## Context and the Audio Element Perspective

**WHILE IT'S IMPORTANT** to make each instrument sound good, don't spend too much time equalizing each one in isolation. Ultimately, the way the instruments sound in the context of the mix should take priority.

## dB vs. Q and Frequency Dispersion

**AS YOU ATTEMPT TO** create low-end density and high-end energy and aggression in your mixes, you'll undoubtedly make significant boosts and cuts to the frequencies. Although 12dB of frequency gain could be seen as over the top for most genres, this is not the case when mixing modern metal. Unfortunately, sometimes this much of a boost can make an instrument sound unnatural, obtrusive and harsh. Instead, consider using less gain with a wider (lower) Q value. By doing so, you'll raise the gain of a wider band of frequencies but by a lesser amount than you would have had to raise the narrower band. This may produce a more natural-sounding effect.

When attenuating, it's appropriate to use a tight (higher) Q setting, as you will often be seeking to remove, or significantly reduce, what is usually a narrow bandwidth of resonant or undesired frequencies.

In general, avoid amplifying or cutting the same frequencies on too many different elements of the mix—the first will overemphasize that portion of the frequency spectrum, and the second will create a frequency hole. This is especially important when working on the kick drum and bass portion of your

mix, as you need these two elements to sit together in the low end. It's usually beneficial to solo each of these sounds to determine the best EQ choices, but as always make sure the results sound good within the entire mix.

## Using the Octaves

**WHEN TWO INSTRUMENTS** are in the same frequency range, it may not sound good to boost the same frequencies on each, as this can lead to masking or over-emphasis of the particular frequency. To achieve a psychoacoustic effect similar to boosting, consider amplifying frequencies an octave higher. For example, if you want to boost the bass at 85Hz but this turns out to be a critical frequency for the kick drum, consider amplifying the bass at 170Hz instead.

## CRITICAL FREQUENCY RANGES

### Kick Drums and Bass

**AVOID AMPLIFYING ANYTHING** lower than 70Hz on either instrument, as this can create a boomy, muddy mix, which would be emphasized by compression in the mastering stage. Be sure to vary the frequencies for each instrument if you make any creative EQ boosts, as described in the previous section.

You can give the kick drum clarity

by heavily cutting the low mids, around 300 to 450Hz, where there is a lot of unwanted energy that can sometimes distort speakers. This can also help provide room for the bass to breathe. The essential high-end attack and kick-drum beater click can usually be located and dialed in the range from 4 to 8kHz.

If your layered bass tracks include a track of distorted bass and the result sounds muddy and harsh, you can remove the lows and highs from the distorted bass track, as the other bass sources will provide the necessary low-end weight and high-end note definition. Overall, a less “woofy” bass sound with better clarity can be achieved by using corrective EQ in the range from 200 to 400Hz, and this can also help provide space for the rhythm guitars to sit in. The high-end note presence and definition of a bass can be dialed in from 2 to 4kHz.

## Snare

**THE WEIGHT AND BODY** of a snare is usually located around 175 to 450Hz, depending on the snare's size, tuning and construction materials. To accentuate the attack, boost the area around 3.5 to 8kHz; to emphasize the “spit” of the snare wires, boost the 10 to 12kHz area. As an alternative, try cutting the lower frequencies for a similar psychoacoustic effect.



## Toms

**USE THE SWEEP Q** technique to locate and emphasize the frequencies for the stick attack to help the toms cut through.

## Metalwork

**A GENTLE BOOST** above 10kHz can help provide brightness, but be careful that it doesn't make the hats, ride and overheads too abrasive in the process.

## Guitars

**TRY TO KEEP** any creative boosts in the range from 85 to 125Hz, as going below this can interfere with the kick and bass. To reduce honk from the mids,

cut frequencies in the 1-to-3kHz range and experiment with making broad midrange boosts to compensate for this cut or you may end up with a thin, overly scooped guitar tone. The essential high-end brightness can be dialed in around 5 to 8kHz.

## Vocals

**TO MAKE VOCALS** sit well within the mix, boost the presence around 4 to 5kHz. This may require that you insert a de-esser in the signal path prior to the EQ to eliminate sibilance. If the vocal still sounds flat and lifeless, add some "air" in the 10-to-12kHz range.

## COMPRESSION

**THE KICK AND SNARE** will often require heavy-handed compression settings to get them to sit in the mix at a

constant level. However when mixing metal, which will usually involve drum sample reinforcement or replacement, extreme compression is usually less essential due to the consistency that the samples will bring to the kick and snare dynamics. If you are not using drum samples or using them subtly to reinforce the spot mics, it's more likely that you will need to rely on compression for the dynamic consistency and power required of the genre's drum tones.

The basic compression principle for your drums will depend on whether you wish to emphasize the transient attack or the body of the drum in question. To emphasize the transient, use a slow attack setting, perhaps in the region of 20 milliseconds. This will allow the transient to come through before the compressor clamps down on the body of the drum source. Set the threshold so that the drum decay is above it. Alternatively, if you are trying to bring out the body and weight of the drum in question, a faster attack time and release time, perhaps around a few milliseconds, will be required, with the threshold set below the attack, but above its body. By clamping down on the transient attack of the drum, the body will be emphasized.


It's safe to say that modern metal rhythm guitar tones are by their very nature overdriven and require no additional compression. And where drums are concerned, I prefer the pinpoint accuracy of overheads that have not been compressed. However, bass and vocals will invariably need heavy compression, often with higher ratios (8:1 and above). In many instances, I will use parallel compression by applying this on the channel as well as the group, and using different settings on each. The vocals may also require some automation to help them stay at a constant level.

## EFFECTS

**IN LAST MONTH'S ARTICLE**, I wrote at length about how to minimize the degree to which the acoustic surroundings color the source. It's here at the mixing stage that this will pay dividends with the drum tracks, as you will be able to effectively control the correct level of ambience using digital reverb.

Although digital reverb can be viewed as the collective glue that brings the whole mix together, I believe less is more, particularly with regard to the number of different reverbs that are used for a mix. By using many different reverb sizes in a mix, you are effectively putting the various elements into different "rooms." While this may be fine for some genres, it usually sounds inappropriate on a modern metal production.

Avoid inserting reverb and delay effects onto the individual tracks. This wastes CPU processing by requiring that you insert many instances of the plug-in; it also degrades signal quality,



because the whole of your audio signal is sent through the plug-in. Instead, place reverb and delay plug-ins on a stereo aux channel, and use the send bus on an audio track's channel strip to patch the original signal into the effect plug-in. This way, the original signal will be present in the mix, and the effected signal can be blended in using the fader on the aux channel that contains the plug-in. This is also an efficient way to use plug-ins, because any instrument that uses the effect can be patched into the aux channel—much better than inserting the plug-in onto every channel that needs it.

If you want to add some low-end

boom to the kick drum, a small amount of tight reverb can be applied, but make sure the track has room for ambience. For metalwork, I prefer to keep things dry to maintain pinpoint accuracy, but other producers have different opinions on this. As for the snare and toms, opt for a short, tight plate reverb, usually less than a second in length, but obviously dependent on the tempo and drum performance of the track. The more complex the snare subdivisions and drum parts, the less the ambience you should apply to the track.

Make sure that you use some pre-delay to set the reverb tail slightly apart from the initial transient attack of the source, as would occur in the real world. A setting of 8 to 15 milliseconds will usually be sufficient, but use a higher setting for longer reverb times.

For the vocals, I like to use a different reverb with a longer reverb decay time. However, be careful: too

much reverb can reduce intelligibility. For metal productions, I recommend using a greater level of delay than reverb.

In some instances, particularly where the performances and tones are relatively dense and intense, I find it's sufficient to use just one short plate reverb for the snare, toms and vocals. This acts as a glue that makes these instruments sound as if they are in the same acoustic space.

Unless doing so as a special effect on a specific section, never use reverb on the bass, as this will muddy the tone and minimize clarity and note definition.

## BALANCING

**DON'T BE AFRAID** to set your kick drum levels slightly higher than the snare level. The kick drums will be the first things that will get lost when mastering compression is applied, as will the vocal, though to a lesser extent.

Most demos suffer from too little bass. If you're having trouble getting the bass to sit well in the mix, add some distortion to the signal or use more of the distorted bass track if you have one.

## MASTERING AND MASTER BUS PROCESSING

**ONCE YOUR MIX IS** complete, it will go on to the mastering engineer. A primary task of mastering extreme metal is to aggressively minimize the dynamic range to retain a consistent power and fullness, particularly in the low end of the mix. Another goal is to keep the final volume on the higher side of the spectrum, without introducing distortion.

To get a general idea of how mastering compression will affect balance level and frequency, insert a compressor over your stereo output bus while mixing. Keep the ratio fairly low (no more than 2:1) with a fairly high threshold, providing no more than 3 or 4dB of gain reduction, which will likely occur with kick drum hits. This compressor should be removed prior to mastering, since the mastering engineer will want a clean stereo mix with no master bus processing.

If you use a limiter, set it for a fast attack and fast release, then slow these settings until a natural, relatively transparent sound is achieved. In addition, use a global EQ on your master bus to filter out frequencies below 55Hz, as this will help the compressors and limiters perform more efficiently and assist the focus the mix. If there is a lot of crash ride work and your completed mix sounds slightly abrasive, consider filtering above 16kHz.

I wish you all the best in taking these theories, procedures and common approaches for the genre, and personally refining them, so that you develop your own unique mixing style. **GW**

## Item 9

# Heavy Fundametalisms

Music, Metal & Politics

**Edited by**

**Rosemary Hill & Karl Spracklen**



# **Heavy Fundametalisms: Music, Metal and Politics**

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Music, Metal and Politics**

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**Rosemary Hill and Karl Spracklen**

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# **Intelligent Equalisation Principles and Techniques for Minimising Masking when Mixing the Extreme Modern Metal Genre**

*Mark Mynett, Jonathan Wakefield and Rupert Till*

## **Abstract**

The intensity, complexity and energy of performance, combined with the power and density of the tones involved are characteristics of the extreme metal genre. These characteristics present numerous problems when striving to achieve the clarity, definition and hyper-realism of performance required for this genre's production. Avoiding masking in a mix is a fundamental aspect of clarity, definition, intelligibility and perceived loudness and due to the fact that masking especially occurs in a dense mix, and is more pronounced in low frequencies, is particularly applicable to mixing the down-tuned extreme metal genre. Masking in simple terms is the ability of frequencies of one sound to obscure or inhibit (i.e. mask) the frequencies of another sound. This paper will draw upon the first author's eight years of experience producing within the metal genre, including releases through Sony and Universal and working with the likes of Colin Richardson and Andy Sneap.

**Key Words:** Heavy metal, masking, performance, power, production.

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## **1. Introduction**

The way music is balanced, equalised, processed and effected has an overwhelming impact on the way it is perceived and in its own right, mixing is a form of art.<sup>1</sup> Mixing extreme metal can be considered as very self-indulgent, and will usually display a different design ethos than for other genres. Here, hyperrealism of production is required, and this is characterised by a particular emphasis on definition, clarity and intelligibility. To achieve this, separation between the instruments is essential, and with this in mind, avoiding masking should be a primary concern when making equalisation decisions. This ability to clearly be able to distinguish all the parts so that your interest is maintained over repeated listens is often referred to as Multi Stream Perceptual Ability.<sup>2</sup>

For the purposes of this paper, extreme metal is a generic term for a number of related heavy metal subgenres. Joel McIver says 'extreme metal is, by definition, music which is faster, harsher, heavier or more aggressive than...mainstream heavy metal.'<sup>3</sup> However, according to Keith Kahn-Harris,

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who is an ethnographer specialising in the area, the defining characteristics of extreme metal can all be regarded as clearly transgressive as the ‘extreme’ traits noted above are all intended to violate or transgress given cultural, artistic, social or aesthetic boundaries.<sup>4</sup>

## **2. Equalisation and Extreme Metal**

Although equalisation was primarily invented as a technical sonic correction device to overcome the poor frequency response exhibited by early microphones and telephone cables<sup>5</sup>, arguably, the greatest single challenge that the art of mixing presents is the perception, understanding and manipulation of frequencies through equalisation.

Achieving a strong balance between the frequency ranges is a central and essential element for all styles of production. However with the intensity, density and down-tuned nature of the tones and performances involved with extreme modern metal, getting a heavy, yet tight low end which retains note definition and clarity is a particular challenge of mixing for the genre; as is achieving a clean high end which embodies the necessary attack and energy without sounding brittle and abrasive.

According to our interview with Andy Sneap, one of the biggest challenges to modern metal production is getting the low end of the mix right. In striving for a ‘heavy’ production, many mixers will excessively amplify the wrong low-end frequencies, resulting in an uncontrolled, boomy and flabby mix. Alternatively, a production with a deficiency of the right bass frequencies will lack impact and sound thin. One of the keys to getting this aspect of the mix right, is by creating a very specific space and a place for each instrument to sit and breathe. This will partly be achieved by avoiding masking.

## **3. Masking**

Masking, in simple terms, is the ability of frequencies of one sound to obscure, or inhibit, (i.e. mask) the frequencies of another sound. From a mixing perspective, this equates to combining two or more instruments containing similar frequencies which fight for the same sonic space, with the quieter or weaker of these sounds having this range of frequencies obscured or made inaudible by the louder or more dominant one.<sup>6</sup>

Avoiding masking in a mix is a fundamental aspect of separation, definition and perceived loudness, and due to the fact that this especially occurs in a dense mix, and is more pronounced in low frequencies; avoiding masking is essential to getting the low-end right for a modern metal production. Before looking at specific intelligent equalisation principles and techniques for minimising masking, two errors that many mixers who are

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novices to the metal genre, make with their EQ decisions will be presented. These errors can directly increase the likelihood of masking.

A frequent mistake that many beginners make, when trying to achieve the necessary ‘weight’ for a modern metal production, is the tendency to focus on only boosting, rather than attenuating frequencies. This will, of course, increase the overall level of the audio, and therefore, rather than assessing the way that the audio has actually been shaped, can misguide our overall evaluation; in other words the ‘louder-perceived-better’ principle. This focus will usually result in instruments fighting for room, with the weaker of these sounds becoming masked and thereby lacking clarity and definition in the mix.

By also opting for the corrective EQ/attenuation route, frequency choices will usually be that much more effective. When attenuating, it is appropriate to use a tight (higher) ‘Q’ setting, as you will often be seeking to remove, or significantly reduce, what is usually a narrow bandwidth of resonant or undesired frequencies. But because our ears tend to find the attenuation, rather than the amplification, of frequencies less appealing, then beware that it may take longer to realise the benefits of these changes.

Another tendency of novice mixers is to spend too much time manipulating and fine tuning their EQ choices while assessing the individual instruments or audio track in isolation. Although this can initially be useful (particularly when finding unwanted resonant frequencies), audio is hugely impacted by its context, and this is never more so than when dealing with the heavy, dense tonalities of extreme metal. By giving priority to the overall impact of EQ decisions as they sound within the rest of the mix, it is much more likely that these will be appropriate to addressing masking issues, resulting in stronger overall separation to the mix.

#### **4. Anti-Masking and Filters**

As a basic principle to avoid frequencies of one sound obscuring another, it is not so much a case of dialling in frequencies, as it is firstly removing the non-essential or wrong frequencies, so that instruments that *do* have essential elements of their sound in this range then have space to ‘breathe’ in. This would then be combined with emphasising the correct areas within the remaining frequency range.

With this in mind, the importance of firstly integrating high pass filters (HPFs) into your equalisation decisions needs to be emphasised. When used correctly, the treated instrument will be perceived as being louder and more defined, with better clarity to the overall mix.

Other than notable exceptions such as perhaps sub bass boom samples, HPFs will often be required on every single instrument and the busier the mix, the higher the frequency selected for each filter. For a particularly dense production with fast double kicks, blast beats, string



sections, keyboards etc (e.g., the ‘symphonic’ black metal band Dimmu Borgir) then mixing will require extensive and aggressive use of HPFs to help retain intelligibility for all these instruments.

As a general guide for mixing extreme modern metal, it will often be appropriate to use a HPF to remove anything below 60Hz right across the audio, and in many instances a HPF will need to be used to remove frequencies right up to the area of the low-end that is getting amplified. Clearly any boosts in the 20-60Hz sub-bass range should be avoided, as this will invariably wreck a mix for this genre.

Although used nowhere near as frequently as a HPF, Low Pass Filters can be implemented to remove high end noise or hiss, and can also be used to mark the highest usable frequency. For example, rolling the bass off above 6/7KHz, where there is little or no frequency content required for bass, can in turn remove or minimise the way in which these non essential frequencies might mask, perhaps the cymbals, and therefore increase the cymbals separation and definition within the mix.

Having removed these unwanted frequencies, the remaining essential areas can now be correctly emphasised.

## **5. Conclusions: Intelligent EQ Principles to Avoid Masking**

To gain a louder, tighter and more powerful mix, the simultaneous amplification or attenuation of the same frequency on different instruments should be avoided. Boosts at the same frequency on multiple instruments have the tendency to accumulate, and sound unnatural and unpleasing, with an unpredictable overall mix level due to the resulting ‘loud’ section created in the frequency spectrum. Conversely, making the same frequency cuts on multiple instruments can effectively create an artificial sounding ‘gap’ in the production’s frequency range, making the mix unstable on different systems. Therefore, amplifying or attenuating both your kick drum and bass groups at the same frequency should be avoided, as should repeatedly boosting or attenuating the same frequency across the composite tracks within these groups (e.g. Kick mic hole/Kick mic beater/Kick sample). By varying the frequencies being amplified and attenuated, a more balanced tonal distribution and a louder, heavier mix will be achieved as a result.

To gain a strong balance between the frequency ranges when mixing this genre, there is a strong possibility that there are going to be some significant frequency boosts and cuts. Although 8dB of frequency gain could be seen as over the top for some genres, this is not the case when mixing modern metal. However, aggressively boosting a certain frequency range can be quite obtrusive (particularly if done so to a narrow range) and this additionally increases the likelihood of masking and frequency accumulation.

A technique to minimise the need to do this, is to opt for the attenuation of frequencies on masking instruments, rather than amplification

of the same to the instrument/audio being equalised. For instance, a snare may lack impact because it is being masked by other instruments around the 200Hz region where, generally speaking, the body and weight of a snare is. Rather than simply amplifying the snare at 200Hz to fight the other instruments for this range, and in the process cause an unnatural accumulation of frequencies here, you should experiment with attenuating the 200Hz region on the instrumentation that is masking the snare. Continuing with this anti-masking principle, experimentation with mirrored EQ choices can be highly effective. Here, the amplification of a certain frequency on one instrument is mirrored with the attenuation of the same frequency on another relevant instrument. By doing so, less gain can be used whilst achieving the same impact of a much greater boost, and generally speaking, the audio will sound less processed and much more natural as a result. To use an example, whether you are dealing with the growls of a death-metal vocalist or a performance with high-pitched screams, the vocals are predominantly going to be in the mid-range. In the battle to get as big a guitar tone as possible, you may then have problems gaining vocal clarity and intelligibility due to not having left enough room in the mid-range for the vocals to sit. If this is an issue, then the mirrored EQ principle will often provide the appropriate solution. Find a frequency range in the vocal sound that contains pleasing tonal characteristics, and combine boosts to accentuate this, with attenuation of the same range on the rhythm guitar group.

### Notes

<sup>1</sup> S Alten, *Audio in Media*, Wadsworth Publishing, Belmont CA, USA, 2002; R J Burgess, R.J., *The Art of Music Production*, Omnibus Press, London, 2002; H Massey, *Behind the Glass. Top Record Producers Tell How They Craft the Hits*, Backbeat Books, San Francisco, 2000; W Moylan, *The Art of Recording: Understanding and Crafting the Mix* (second edition), Focal Press, Boston, 2002.

<sup>2</sup> T. Holman, *Surround Sound Up and Running*, Focal Press, London, 2008.

<sup>3</sup> J. McIver, *Extreme Metal II*, Barnes and Noble, New York, 2005.

<sup>4</sup> K. Kahn-Harris, *Extreme Metal: Music and Culture on the Edge*, Berg Publishers, Oxford, 2006.

<sup>5</sup> M. Cunningham, *Good Vibrations - A History of Record Production*, Sanctuary Publishing Ltd., London, 1996.

<sup>6</sup> R Izhaki, *Mixing Audio: Concepts, Practices and Tools*, Elsevier Science Ltd., London, 2007.

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